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MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL, P.C.
P.O. BOX 398
AUSTIN, TX 78767-0398

| EXAMINER | |
|---|---|
| KIM, DAVID S | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2633 | |

DATE MAILED: 02/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/918,886 | YEE ET AL. | |
| | Examiner | Art Unit | |
| | David S. Kim | 2633 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *17 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-5,7,8,10-39,41-58,61 and 62* is/are pending in the application.

4a) Of the above claim(s) *30-37 and 55-58* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,8,10,11,14-29,38,39,41-54,61 and 62* is/are rejected.

7)☒ Claim(s) *12 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Priority*

1. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application); the disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

In this case, this instant application is a continuation-in-part of pending U.S. Patent Application Serial No. 09/728,373, "Optical Communications Using Heterodyne Detection," by Ting K. Yee and Peter H. Chang, filed on November 28, 2000, which is a continuation-in-part of abandoned U.S. Patent Application Serial No. 09/474,659, "Optical Communications Using Heterodyne Detection," by Ting K. Yee and Peter H. Chang, filed on December 29, 1999. However, none of the disclosures of these parent applications are sufficient to comply with **the requirements of the first paragraph of 35 U.S.C. 112 for pending claims 1-5, 7-8, 10-39, 41-58, and 61-62.** Therefore, this instant application does not receive the benefit of the earlier filing dates of these parent applications under 35 U.S.C. 120 for pending claims 1-5, 7-8, 10-39, 41-58, and 61-62.

2. Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged. However, the disclosure of the provisional application upon which priority is claimed and the disclosure of the instant application are not exactly the same. Thus, the provisional application may not provide adequate support under 35 U.S.C. 112 for **all** the claims of this application.

3. Applicant presented arguments about the above priority issues in a response filed on 17 October 2005 (p. 18-19). Applicant requests the Examiner to permit the present application to claim the benefit of the earlier filed applications, U.S. Patent Application 09/728,373 filed on 28 November 2000 (now U.S. Patent 6,493,131, issued 10 December 2002), which was a continuation-in-part to U.S. Patent Application 09/474,659 filed on 29 December 1999 (now abandoned).

Examiner respectfully notes that the **priority *claim*** to these earlier filed applications was not refused. Note that Examiner's review of the disclosures of these earlier filed applications implies that the claim was permitted. Rather, it is the ***benefit*** of the earlier filing dates that is refused. For further details, see MPEP 201.11, section I, subsection B.

***Information Disclosure Statement***

4. The information disclosure statement filed on 19 February 2002 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but all the information referred to therein has not been considered. Examiner considered the information documents that were readily accessible, such as patents and journal documents that are available through online access. The other documents have not been considered; these documents are indicated by **a lack of Examiner's initials** next to the document listings. Should Applicant desire the consideration of these documents by Examiner, Applicant is advised to **send a legible copy** of each of these documents to the Office.

5. In Applicant's response filed on 17 October 2005, Applicant indicated an intention to attempt to obtain copies of such unconsidered documents for submission in a supplemental information disclosure statement. However, Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

***Drawings***

6. Applicant's compliance with the objections to the drawings in the previous Office Action (mailed on 13 July 2005) is noted and appreciated.

Applicant responded to the drawing objection regarding **claim 5** by pointing to Fig. 22 as support for the claim language in claim 5. However, Fig. 22 is directed to non-elected Species II (designated in an Office Action mailed on 03 November 2004). Accordingly, the drawing objection to claim 5 remains. The

drawings remain objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in claim 5. No new matter should be entered. As a remedy, Examiner respectfully suggests the submission of a new figure showing the limitations of claim 5 or the cancellation of claim 5.

Applicant responded to the drawing objection regarding **claims 7 and 24** by amending these claims. Applicant's amendments overcome the previous objection, which are now withdrawn.

Applicant responded to the drawing objection regarding **claim 13** by amending Fig. 18A to show all of the features recited in claim 13. However, amended Fig. 18A is disapproved. In Fig. 18A, much of the bottom half is not supported by the specification and constitutes new matter. For example, the original disclosure does not disclose the bottom detectors 1818 and 1820, the bottom sync detectors 1822 and 1824, the bottom comparison circuitry 1834, and the associated connections. Rather, Fig. E-23B in provisional application 60/265,251 supports just one detector 1818, one detector 1820, one sync detector 1822, one sync detector 1824, one comparison circuitry 1834, and the associated connections. Accordingly, the drawing objection to claim 13 remains. The drawings remain objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in claim 13. No new matter should be entered. As a remedy, Examiner respectfully suggests amending Fig. 18A to correspond more closely to supported Fig. E-23B in provisional application 60/265,251.

7. Replacement drawings were received on 17 October 2005. Figs. 3, 8, 11, 13B-13C, 15A-15D, 18B-18C, 19-22, 25A-25B, and 26-27 are approved. Figs. 1-2, 4-7 , 9-10, 12-13A, 13D-13E, 14A-14B, 16-18A, 23, and 24A-24D are disapproved. These drawings are disapproved and objected to because of many minor errors. Compliance with the following suggestions would obviate the drawing objections.

**Fig. 1**

In Fig. 1, replace the frequency label "r" with "$f_s$" under the spectrum 140. See paragraph [0056] for support.

In Fig. 1, label the heterodyne detector with "180" as in the old Fig. 1 filed on 30 July 2001. See paragraph [0055] for support.

In Fig. 1, replace reference characters "L54L", "L54u", and "L56" with "154L", "154u", and "156", respectively, as in old Fig. 1 filed on 30 July 2001. See paragraph [0059] for support.

In Fig. 1, delete "$f_s$" under the reference character "170". Paragraph [0059] teaches that component 170 may be offset from $f_s$ instead of being located at $f_s$ as shown in Fig. 1.

In Fig. 1, replace "B6" with "136" and replace "Low" with "Law". See paragraph [0062] for support.

**Fig. 2**

In Fig. 2, add a reference character "200" that points to the entire method. See paragraph [0028] for support.

In Fig. 2, replace reference character "24" with "240" as in old Fig. 2 filed on 30 July 2001. See paragraph [0059] for support.

**Fig. 4**

In Fig. 4, replace all instances of "$T_1$" with "$\pi$" as shown in old Fig. 4 filed on 30 July 2001. See paragraph [0067] for support.

**Fig. 5**

In Fig. 5, replace "Biased off Null" with "Biased at Null" as shown in old Fig. 5 filed on 30 July 2001.

**Fig. 7**

In Fig. 7, add a reference character "720" that points to the multiplier as shown in old Fig. 7 filed on 30 July 2001. See paragraph [0074] for support.

**Fig. 9**

In Fig. 9, the input signal is missing labels "154L" and "156". See how Figs. 6-7 provide these labels.

In Fig. 9, add a reference character "720" that points to the upper multiplier. Also, add a reference character "720" that points to the lower multiplier. See paragraph [0079] for support.

In Fig. 9, add a reference character "912" that points to the phase shifting element as shown in old Fig. 9 filed on 30 July 2001. See paragraph [0080] for support.

**Fig. 10**

In Fig. 10, label the Pilot Tone Generator with "1030" as in old Fig. 10 filed on 30 July 2001. Also, label the Information Signal with "140" as in old Fig. 10 filed on 30 July 2001. See paragraph [0081] for support.

In Fig. 10, the spectrum drawing shows a label "$f_c$" next to a label "$f_s$". Replace "$f_c$" with another instance of "$f_s$" so there are two instances of "$f_s$" next to each other as shown in old Fig. 10 filed on 30 July 2001.

**Fig. 12**

In Fig. 12, label the E/O Converter with "1210" as in old Fig. 12 filed on 30 July 2001. See paragraph [0092] for support.

**Fig. 13A**

In Fig. 13A, there are two instances of "1234A". Replace the lower instance with "1234D"as in old Fig. 13A filed on 30 July 2001. See paragraph [0093] for support.

**Fig. 13E**

In Fig. 13E, replace "1253A" with "1253D" and replace "1254A" with "1254D" and replace "1262C(L)" with "1262C(U)" as shown in old Fig. 13E filed on 30 July 2001. See paragraph [0103] for support.

**Fig. 14A**

In Fig. 14A, label the lower sideband to the left of optical carrier 1411A with "1412A(L)" and label the upper sideband to the right of optical carrier 1411A with "1412(U)" as shown in old Fig. 14A filed on 30 July 2001. See paragraph [0086] for support.

**Fig. 16**

In Fig. 16, label the upper optical transmitter with "1610A" as in old Fig. 16 filed on 30 July 2001. Also, label the lower optical transmitter with "1610B" as in old Fig. 16 filed on 30 July 2001. Otherwise, the reference character "1610" in paragraphs [0043, 0047, 0050, 0054] is not in the figures. Also, see paragraph [0108] for support.

In Fig. 16, replace the rightmost "1662A(u)" with "1666A(u)" as shown in old Fig. 16 filed on 30 July 2001. See paragraph [0109] for support.

In Fig. 16, replace the rightmost "1662B(u)" with "1666B(u)" as shown in old Fig. 16 filed on 30 July 2001. See paragraph [0110] for support.

In Fig. 16, extend the lead line for spectrum 1692B to the input line for receiver 1630B. Otherwise, Fig. 16 shows spectrum 1692A and 1692B for the input line to receiver 1630A.

**Fig. 17**

In Fig. 17, remove reference character "1700" and its lead line since it does not appear in the specification.

**Fig. 18A**

In Fig. 18A, add a reference character "1800" that points to the entire device. See paragraphs [0044-0045, 0126] for support.

In Fig. 18A, much of the bottom half is not supported by the specification and constitutes new matter. For example, the original disclosure does not disclose the bottom detectors 1818 and 1820, the bottom sync detectors 1822 and 1824, the bottom comparison circuitry 1834, and the associated connections. Rather, Fig. E-23B in provisional application 60/265,251 supports just one detector 1818, one detector 1820, one sync detector 1822, one sync detector 1824, one comparison circuitry 1834, and the associated connections. Amend Fig. 18A to correspond more closely to supported Fig. E-23B in provisional application 60/265,251.

**Fig. 23**

In Fig. 23, remove reference character "2798" and its lead line since it does not appear in the specification.

**Fig. 24C**

In Fig. 24C, add a reference character "2416" that points to the spectrum. See paragraph [0146] for support.

**Fig. 24D**

In Fig. 24D, remove the tones from the spectrum as indicated by paragraph [0146] on p. 44, l. 26 – p. 45, l. 1.

8. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

9. The disclosure is objected to because of many minor errors. Compliance with the following suggestions would obviate the objections to the specification (additions are the underlined portions, deletions are the strikethrough portions).

**End of paragraph [0001]** – update status of applications, p. 1, l. 20:

-- Ting K. Yee and Peter H. Chang, filed December 29, 1999 (now abandoned). --

**Paragraph [0003]** – update status of applications:

-- This application related to ~~pending~~ U.S. Patent Application Serial No. ~~09/746,261~~ 09/746,370, "Wavelength-Locking of Optical Sources," by Shin-Sheng Tarng, et al., filed December 20, 2000 (now U.S. Patent No. 6,493,131, issued December 10, 2002). --

**Paragraph [0004]** – update status of applications:

-- This application also relates to ~~pending~~ U.S. Patent Application Serial No. 09/747,261, "Fiber Optic Communications using Optical Single Sideband Transmission and Direct Detection," by Ting K. Yee, ~~and~~ Peter H. Chang, and James F. Coward, filed December 20, 2000(now abandoned). --

**In paragraph [0005]** – update status of applications, p. 2, l. 10-12:

-- ~~pending~~ U.S. Patent Application Serial No. 09/569,761, "Channel Gain Control For An Optical Communications System Utilizing Frequency Division Multiplexing," by Laurence J. Newell and James F. Coward, filed May 12, 2000(now abandoned). --

**Paragraph [0006]** – update status of applications:

-- This application also relates to ~~pending~~ U.S. Patent Application Serial No. 09/405,367, "Optical Communications Networks Utilizing Frequency Division Multiplexing," by Michael W. Rowan, et al., filed Sept. 24, 1999 (now U.S. Patent No. 6,529,303, issued March 4, 2003); which is a continuation-in-part of ~~pending~~ U.S. Patent Application Serial No. 09/372,143, "Optical Communications Utilizing Frequency Division Multiplexing and Wavelength-Division Multiplexing," by Peter H. Chang, et al., filed August 20, 1999 (now abandoned); which is a continuation-in-part of U.S. Patent Application Serial No. 09/229,594, "Electrical Add-Drop Multiplexing for Optical Communications Networks Utilizing Frequency Division Multiplexing," by David B. Upham, et al., filed January 13, 1999 (now U.S. Patent No. 6,452,945, issued Sept. 17, 2002); which is a continuation-in-part of U.S. Patent Application No. 09/035,630, "System and Method for Spectrally Efficient Transmission of Digital Data over Optical Fiber", by Michael W. Rowan, et al., filed March 5, 1998 (now abandoned). --

**In paragraph [0059]** – delete informality on p. 13, l. 4:

-- including one frequency component 170 located at the difference frequency ~~Δf~~ between the --

Removal of this Δf avoids confusion with the other Δf on p. 12, l. 25.

**In paragraph [0063]** – update status of applications, p. 14, l. 26 – p. 15, l. 3:

-- and ~~co-pending~~ U.S. Patent Application Serial No. 09/569,761, "Channel Gain Control For An Optical Communications System Utilizing Frequency Division Multiplexing," by Laurence J. Newell and James F. Coward, filed May 12, 2000 (now abandoned). --

**In paragraph [0092]** – update status of applications, p. 25, l. 15-17:

-- of ~~co-pending~~ U.S. Patent Application Serial No. 09/405,367, "Optical Communications Networks Utilizing Frequency Division Multiplexing," by Michael W. Rowan, et al., filed Sept. 24, 1999 (hereinafter, the "FDM Application", now U.S. Patent No. 6,529,303, issued March 4, 2003) --

**In paragraph [0110]** – correct informality on p. 32, l. 3:

-- The subbands 1662B and ~~1668B~~ 1666B are different --

**In paragraph [0116]** – update status of applications, p. 34, l. 12-15:

-- of ~~co-pending~~ U.S. Patent Application Serial No. 09/747,261, "Fiber Optic Communications using Optical Single Sideband Transmission and Direct Detection," by Ting K. Yee, ~~and~~ Peter H. Chang, and James F. Coward, filed December 20, 2000(now abandoned). --

**Paragraph [0132]** – correct informality:

-- The same approach is used to wavelength-lock the optical carrier 1669B generated by optical source 1712B. In Fig. 18B, the nominal wavelength 1875 of carrier 1669B is also located at 6 dB of attenuation, but at the upper edge of the filter transfer function. Thus, too much attenuation means the wavelength is too high, and too little attenuation means the wavelength is too low. --

Otherwise, reference character "1875" is missing from the specification.

**Paragraph [0134]** – update status of applications:

-- As usual, the wavelength locking device 1800 in FIG. 18A is merely an example. Other approaches to wavelength-locking may also be used, including those discussed in ~~co-pending~~ U.S. Patent Application Serial No. ~~09/746,261~~ 09/746,370, "Wavelength-Locking of Optical Sources," by Shin-Sheng Tarng, et al., filed December 20, 2000 (now U.S. Patent No. 6,493,131, issued December 10, 2002). --

**In paragraph [0142]** – correct informality on p. 43, l. 8:

-- splitter 2533 coupled to two optical filters 2535 A-B. --

Otherwise, reference character "2533" is not in the specification.

**In paragraph [0144]** – correct informality on p. 44, l. 3:

-- 2294A-~~2194P~~ 2294P --

Refer to the channels in Fig. 23.

**In paragraph [0144]** – correct informality on p. 44, l. 4-5:

-- In this example, channel 1 (i.e., ~~2794A~~ 2294A) is linearly polarized 2298A and channel 16 (~~2794P~~ 2294P) is similarly linearly polarized 2298E. --

Refer to the channels in Fig. 23.

**The abstract** – remove portions directed to non-elected invention(s):

A transmitter subsystem generates an optical signal which contains multiple subbands of information. The subbands have different polarizations. For example, in one approach, two or more optical transmitters generate optical signals which have different polarizations. An optical combiner optically combines the optical signals into a composite optical signal for transmission across an optical fiber. ~~In another approach, a single optical transmitter generates an optical signal with multiple subbands. The polarization of the subbands is varied, for example by using a birefringent crystal.~~ In another aspect of the invention, each optical transmitter generates an optical signal containing both a lower optical sideband and an upper optical sideband (i.e., a double sideband optical signal). An optical filter selects the upper optical sideband of one optical signal and the lower optical sideband of another optical signal to produce a composite optical signal.

## *Claim Objections*

10. Applicant's compliance with the objections to **claims 18, 47, and 49** in the previous Office Action (mailed on 13 July 2005) is noted and appreciated. Applicant's amendments to these claims overcome the previous objections, which are now withdrawn.

11. **Claims 38** is objected to because of the following informalities:

The order of the steps appears to be out of order and the antecedent bases of some terms may be out of order, as well. Compliance with the following suggestions would obviate the objections to claim 38 (additions are the underlined portions, deletions are the strikethrough portions):

A method for transmitting information across an optical fiber, the method comprising:

generating a first optical signal containing a first subband of information;

generating a second optical signal containing a second subband of information, the second optical signal having a different polarization than the first optical signal, wherein each optical signal has a lower optical sideband and an upper optical sideband; wherein an optical sideband of the first optical signal is adjacent to an optical sideband of the second optical signal;

~~optically filtering the optical signals to attenuate non-adjacent optical sidebands;~~

optically combining the optical signals into a composite optical signal; ~~and~~

optically filtering the composite optical signal to attenuate the non-adjacent optical sidebands;

and

transmitting the composite optical signal across an optical fiber.

Appropriate correction is required.

## *Claim Rejections - 35 USC § 112*

12. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

13. **Claim 5** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Notice that the amendment to parent claim 1 already introduces an optical filter. Combined with the optical filter introduced in claim 5, the system of claim 5 includes two types of optical filters. The disclosure does not teach the use of two such types of optical filters together in one embodiment. Accordingly, claim 5 introduces new matter.

14. **Claims 61-62** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Note the following limitation in independent claim 61:

"...wherein the wavelength-locking device is coupled to the first optical tap and to the second optical tap and configured to lock the frequency separation based on ***a ratio*** of the portions tapped by the optical taps."

However, paragraphs [0131-0132] teach the use of a ratio for ***each*** optical signal. Fig. 18B shows multiple (2) signals, each signal requiring the use of its own associated ratio. The disclosure does not

support the use of just one ratio to lock the frequency separation between multiple optical signals. Accordingly, claim 61 introduces new matter.

As a remedy, consider the following suggestion to amend claim 61 (additions are the underlined portions, deletions are the strikethrough portions):

"...wherein the wavelength-locking device is coupled to the first optical tap and to the second optical tap and configured to lock the frequency separation based on a multiple ratios of the portions tapped by the optical taps."

***Allowable Subject Matter***

15. The previously indicated (mailed by Office on 13 July 2005) allowability of subject matter incorporated by Applicant's amendment (filed by Applicant on 17 October 2005) into the independent claims is withdrawn in view of the newly discovered reference(s) to Dekker. In particular, Dekker (U.S. Patent No. 2,156,278) addresses the **subject matter of claims 9 and 40-41 of a previous version of these claims** (filed by Applicant on 06 December 2004). Rejections based on the newly cited reference(s) follow.

16. **Claims 12-13** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. **Claims 61-62** would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 1st paragraph, set forth in this Office action.

18. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

***Claim Rejections - 35 USC § 103***

19. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

20. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly

owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Tsushima et al. as primary reference**

21. **Claims 1-2, 4-5, 8, 10-11, 19-20, 38-39, 41-42, and 48** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima et al. (U.S. Patent No. 5,305,134, hereinafter "Tsushima") in view of Bergano et al. (U.S. Patent No. 6,134,033, hereinafter "Bergano") and Dekker (U.S. Patent No. 2,156,278).

**Regarding claim 1**, Tsushima discloses:

An optical communications system comprising:

a transmitter subsystem (Figs. 1 and 4) comprising:

at least two optical transmitters (e.g., transmitters 4(n-1), 4n), each configured to generate an optical signal containing a subband of information, wherein each optical signal has a lower optical sideband and an upper optical sideband; and

an optical combiner (photocoupler 5) coupled to the optical transmitters configured to optically combine the optical signals into a composite optical signal; and

an optical filter (optical filter 6) coupled to the optical combiner, wherein the optical filter is configured to select one optical sideband (e.g., Fig. 3B) from each optical signal.

Tsushima does not expressly disclose:

each optical signal having a different polarization.

However, Bergano does disclose an optical communications system comprising a transmitter subsystem, which also comprises at least two optical transmitters, each for generating an optical signal, each optical signal having a different polarization (Fig. 1). At the time the invention was made, it would

have been obvious to one of ordinary skill in the art to implement the teachings of Bergano to the system of Tsushima so that each optical signal has a different polarization. One of ordinary skill in the art would have been motivated to do this since introducing this differing polarization teaching can increase the spectrum efficiency of the communications system (Bergano, col. 1, l. 10-11, 28-52). In particular, note that Tsushima teaches a system that employs multiple optical communication channels, each channel having its own frequency/wavelength band for frequency/wavelength multiplexed transmission, and that Bergano expressly teaches the application of this differing polarization teaching to a similar system (Fig. 1).

Tsushima also does not expressly disclose:

wherein the optical filter is configured to select a lower optical sideband from one optical signal and an upper optical sideband from a different optical signal.

Rather, the filter of Tsushima selects an optical sideband from one particular side of one optical signal and another optical sideband from the same respective side of another optical signal (Figs. 3A-3C). However, the selection of various combinations of sidebands for multiplexed transmission is an old technique in the field of sideband transmissions. Simply choosing other combinations of sidebands for multiplexed transmissions leads to intuitively obvious variations of transmitting the same signal contents. For example, Dekker teaches a multiplexed sideband transmission scheme (Fig. 2) to use in place of a scheme that is similar to the scheme employed in Tsushima (compare Fig. 1 of Dekker to Figs. 3C of Tsushima). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ the transmission scheme of Dekker in the system of Tsushima. One of ordinary skill in the art would have been motivated to do this since it can provide at least the benefit of less stringent filter requirements (Dekker, col. 1, l. 49-52) without consuming additional amounts of useful bandwidth (notice that a comparable number of channels in both Figs. 1 and 2 occupies the same amount of bandwidth in both Figs. 1 and 2). Additionally, as already mentioned above, the selection of various combinations of sidebands for multiplexed transmission is an old technique in the field of sideband transmissions that leads to obvious variations of transmitting the same signal contents.

**Regarding claim 2**, Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 1 wherein the optical signals are orthogonally (Bergano, abstract) polarized.

**Regarding claim 4**, Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 2 wherein:

at least one of the optical transmitter comprises:

a wavelength-tunable optical source (Tsushima, e.g., DFB-LDs 4a in Fig. 10), whereby a wavelength of the optical signal generated by the optical transmitter can be tuned by tuning the wavelength-tunable optical source; and

the optical filter comprises:

a comb filter having periodically spaced pass bands (Tsushima, e.g., periodicity in Figs. 3B, 5, and 7).

**Regarding claim 5**, Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 1 wherein:

each optical signal (FSK version, Fig. 3A-3F) has a lower optical sideband and an upper optical sideband.

Tsushima in view of Bergano and Dekker does not expressly disclose:

each optical transmitter comprises:

an optical filter configured to select one optical sideband from the optical signal.

However, Tsushima does teach the use of such an optical filter for each of a plurality of optical transmitters (e.g., optical filter 13(n-1) in Fig. 4). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ such an optical filter in addition the optical filter employed in the treatment of claim 1 above. One of ordinary skill in the art would have been motivated to do this since the use of additional filters is a common way to further remove crosstalk and undesired spectral components between channels, thus providing cleaner transmission signals.

**Regarding claim 8**, Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 1 wherein the optical filter comprises:

a comb filter having periodically spaced pass bands (Tsushima, e.g., periodicity in Figs. 3B, 5, and 7).

**Regarding claim 10**, Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 1 wherein the optical filter is configured to attenuate out-of-band wavelengths (Tsushima, optical filter 6 attenuates wavelengths that are out of the passbands; Dekker, attenuating range in Fig. 2).

**Regarding claim 11**, Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 1 wherein the transmitter subsystem further comprises:

a wavelength-locking device (Fig. 10) coupled to the optical transmitters configured to lock a frequency separation of the optical signals to a predetermined value.

**Regarding claim 19**, Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 1 further comprising:

a receiver subsystem (Tsushima, portion after optical fiber 2 in Fig. 9; Bergano, portion after transmission line 500 in Fig. 5; Dekker, receiver portion of Fig. 3) coupled to the transmitter subsystem by an optical fiber configured to recover the subbands from the composite optical signal.

**Regarding claim 20**, Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 19 wherein the receiver subsystem comprises:

a plurality of heterodyne receivers (Tsushima, receivers 3 in Fig. 9) configured to recover the subbands.

Tsushima in view of Bergano and Dekker does not expressly disclose:

a polarizing splitter module configured to split the composite optical signal according to polarization; and

said plurality of heterodyne receivers *coupled to the polarizing splitter module.*

However, such polarizing splitter modules are well known in the art for isolating channels according to polarization. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ such a module in the receiver subsystem of Tsushima in view of Bergano and Dekker. One of ordinary skill in the art would have been motivated to do this since such a module provides another obvious and known way to help demultiplex the transmission channels of Tsushima in view of Bergano and Dekker.

**Regarding claim 38**, claim 38 is a method claim that corresponds largely to the system claim 1. Therefore, the recited means in system claim 1 read on the corresponding steps in method claim 38. Claim 38 also includes limitations absent from claim 1. Tsushima in view of Bergano and Dekker also discloses these limitations:

wherein an optical sideband of the first optical signal is adjacent to an optical sideband of the second optical signal (Dekker, upper right spectrum in Fig. 5);

optically filtering the optical signals to attenuate non-adjacent optical sidebands (Dekker, sidebands attenuated outside of passband 14 in Fig. 5); and

transmitting the composite optical signal across an optical fiber (Tsushima, optical fiber 2 in figures).

**Regarding claims 39, 42, and 48**, claims 39, 42, and 48 are method claims that introduce limitations that correspond to the limitations introduced by system claims 2, 11, and 20, respectively. Therefore, the recited means in system claims 2, 11, and 20 read on the corresponding steps in method claims 39, 42, and 48.

**Regarding claim 41**, Tsushima in view of Bergano and Dekker discloses:

The method of claim 38 wherein:

the step of optically combining the optical signals into a composite optical signal comprises:

optically combining the optical signals so that a lower optical sideband of the first optical signal is adjacent to an upper optical sideband of the second optical signal (Dekker, upper right spectrum in Fig. 5); and

the step of optically filtering the optical signals comprises:

optically filtering the optically combined optical signals to select the lower optical sideband of the first optical signal and the upper optical sideband of the second optical signal (Dekker, passband 14 in Fig. 5).

22. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima in view of Bergano and Dekker as applied to claim 2 above, and further in view of Kitayama ("Highly spectrum efficient OFDM/PDM wireless networks by using optical SSB modulation").

**Regarding claim 3,** Tsushima in view of Bergano and Dekker discloses:

The optical communications system of claim 2 wherein:

each optical transmitter comprises:

an optical source (Tsushima, e.g., lasers in Fig. 4; Bergano, optical sources 301 in Fig. 3) configured to produce an optical carrier; and

an electro-optic modulator (Tsushima, e.g., modulators in Fig. 4; Bergano, modulators in Fig. 4) coupled to the optical source configured to modulate the optical carrier with the subband of information.

Tsushima in view of Bergano and Dekker does not expressly disclose:

at least one of the optical transmitters further comprises:

a polarization controller configured to make a polarization of the optical signal orthogonal to a polarization of the other optical signal.

Rather, Bergano teaches a polarization combiner 315 to perform the same function or a conventional directional coupler with carefully adjusted states of polarization. However, a polarization controller is an extremely well known device for making optical signals mutually orthogonal. Kitayama teaches such a polarization controller PC in Fig. 3. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ a polarization controller in the system of Tsushima in view of Bergano and Dekker. One of ordinary skill in the art would have been motivated to do this since it is an obvious alternate choice for performing the same function as the polarization adjusting means in Bergano.

23. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima in view of Bergano and Dekker as applied to the claims above, and further in view of Ramaswami et al. (*Optical Networks: A Practical Perspective*, hereinafter "Ramaswami") and Othonos ("Fiber Bragg gratings").

**Regarding claim 7**, Tsushima in view of Bergano does not expressly disclose:

The optical communications system of claim 6 wherein the optical filter is configured to perform a Bragg filter function wherein a filtered signal has a first notch and a second notch.

However, Othonos does disclose an optical filter comprising multiple Bragg filters in series with a Bragg filter function wherein a filtered signal has a first notch and a second notch (Othonos, function with notches in Fig. 38). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to substitute the arrangement employing the Fabry-Perot optical filter (Tsushima, col. 3, l. 67) of Tsushima in view of Bergano and Dekker with an arrangement employing the multiple Bragg filters of Othonos. The arrangement employing the multiple Bragg filters of Othonos would filter by reflection as opposed to filtering by transmission, as with the Fabry-Perot filter of Tsushima. One of ordinary skill in the art would have been motivated to do this since they both have similar comb-like functions (Tsushima, Fig. 3B; Othonos, Fig. 38), and since fiber Bragg gratings introduce advantages over other filtering devices, such as Fabry-Perot filters (Ramaswami, p. 102-106). Such advantages include low loss, easy of coupling (with other fibers), polarization insensitivity, low temperature coefficient, simple packaging, and low cost (Ramaswami, p. 99, 1st full paragraph).

24. **Claims 14-15 and 43-44** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima in view of Bergano and Dekker as applied to the claims above, and further in view of Watanabe et al. ("Optical coherent broad-band transmission for long-haul and distribution systems using subcarrier multiplexing," hereinafter "Watanabe") and Hill et al. (U.S. Patent No. 5,546,190, hereinafter "Hill").

**Regarding claim 14**, Tsushima in view of Bergano and Dekker does not expressly disclose:

The optical communications system of claim 1 wherein each optical transmitter includes:

at least two electrical transmitters configured to generate electrical channels;

an FDM multiplexer coupled to the electrical transmitters configured to FDM multiplex the electrical channels into an electrical high-speed channel, the electrical high-speed channel further including a tone; and

an E/O converter coupled to the FDM multiplexer configured to convert the electrical high-speed channel into the optical signal.

However, Hill teaches these limitations (Fig. 2) of as part of a transmission technique called subcarrier multiplexing (SCM). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to implement SCM with the OFDM system of Tsushima in view of Bergano and Dekker. One of ordinary skill in the art would have been motivated to do this since Watanabe teaches that combining SCM and OFDM is easy and permits one to transmit a vast amount of information through a single optical fiber (Watanabe, p. 116, col. 2, last full paragraph), presumably more information than one could transmit using either SCM or OFDM alone.

**Regarding claim 15**, Tsushima in view of Bergano, Dekker, Watanabe, and Hill discloses:

The optical communications system of claim 14 wherein the at least two optical transmitters comprise:

a first optical transmitter (Hill, Fig. 2) configured to generate a first optical signal containing at least two subbands and a tone (Fig. 4), at least one of the subbands including I and Q signals (I and Q signals in Fig. 2).

Tsushima in view of Bergano, Dekker, Watanabe, and Hill does not expressly disclose:

*asynchronous* I and Q signals.

However, asynchronous data signals are extremely well known throughout the communication arts. They are often contrasted to synchronous data signals. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ asynchronous I and Q signals. One of ordinary skill in the art would have been motivated to do this since asynchronous data signals do not require the transmitting and receiving ends of the communication channel to synchronize before communicating data, thus leading to faster and simpler transmission of data.

**Regarding claims 43-44**, claims 43 and 44 are method claims that introduce limitations that correspond to the limitations introduced by system claims 14 and 15, respectively. Therefore, the recited means in system claims 14-15 read on the corresponding steps in method claims 43-44.

25. **Claims 16-21 and 45-49** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima in view of Bergano, Dekker, Watanabe, and Hill as applied to the claims above, and further in view of Ramaswami.

**Regarding claim 16**, Tsushima in view of Bergano, Dekker, Watanabe, and Hill does not expressly disclose:

The optical communications system of claim 15 wherein:

each of the asynchronous I and Q signals is based on a separate oC-48 signal; and

the subband including the asynchronous I and Q signals has a capacity of approximately 5.0 Gbps of information.

However, OC-48 signals are well known in the art as being part of the *optical channel* (OC) layer as defined by the International Telecommunications Union (Ramaswami, p. 284-285), a standard-making body in the field of telecommunications. OC-48 signals correspond to optical signals with the data rate of approximately 2.5 Gbps. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to base each of the I and Q signals of Tsushima in view of Bergano, Dekker, Watanabe, and Hill on separate OC-48 signals. One of ordinary skill in the art would have been motivated to do this so that one can interface this system of Tsushima in view of Bergano, Dekker, Watanabe, and Hill with other systems that already employ the ITU optical channel (OC) standard data rates. With the I and Q signals being based on OC-48 signals, the subband would have a capacity of approximately 5.0 Gbps of information (OC-48 + OC-48 = OC-96 ~ 5.0 Gbps).

**Regarding claim 17**, Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami discloses:

The optical communications system of claim 14 wherein the at least two optical transmitters comprise:

a first optical transmitter (e.g., Tsushima's transmitter 4(n-1) in view of Hill's Fig. 2) configured to generate a first optical signal containing at least two subbands and a tone (Hill, Fig. 4), each subband having a capacity of approximately 2.5Gbps of information (Ramaswami, see treatment of claim 16 above); and

a second optical transmitter (e.g., Tsushima's transmitter 4n in view of Hill's Fig. 2) configured to generate a second optical signal containing at least two subbands and a tone (Hill, Fig. 4), each subband having a capacity of approximately 2.5Gbps of information (Ramaswami, see treatment of claim 16 above), wherein the second optical signal is orthogonally polarized (Bergano, abstract) to the first optical signal.

**Regarding claim 18**, Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami discloses:

The optical communications system of claim 17 wherein:

the first optical signal (Tsushima, FSK version, Figs. 3A-3F) has a lower optical sideband (Tsushima, e.g., lower half of band ch.(n-1) in Fig. 3A) and an upper optical sideband (Tsushima, e.g., upper half of band ch.(n-1) in Fig. 3A), each optical sideband containing the at least two subbands and tone of the first optical signal (Hill, Fig. 4);

the second optical signal (Tsushima, FSK version, Figs. 3A-3F) has a lower optical sideband (e.g., lower half of band ch.n in Fig. 3A) and an upper optical sideband (e.g., upper half of band ch.n in Fig. 3A), each optical sideband containing the at least two subbands and tone of the second optical signal (Hill, Fig. 4); and

the transmitter subsystem further comprises:

an optical filter (Tsushima, optical filter 6) coupled to the optical combiner configured to allow passing of the lower optical sideband of the first optical signal and the upper optical sideband of the second optical signal (Dekker, passband 14 in Fig. 5).

**Regarding claim 19**, Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami discloses:

The optical communications system of claim 1 further comprising:

a receiver subsystem (Tsushima, portion after optical fiber 2 in Fig. 9; Bergano, portion after transmission line 500 in Fig. 5; Hill, portion after optical fiber 14 in Fig. 1) coupled to the transmitter subsystem by an optical fiber configured to recover the subbands from the composite optical signal.

**Regarding claim 20**, Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami discloses:

The optical communications system of claim 19 wherein the receiver subsystem comprises:

a plurality of heterodyne receivers (Hill, Fig. 1, col. 5, l. 30-31; Tsushima, receivers 3 in Fig. 9) configured to recover the subbands.

Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami does not expressly disclose:

a polarizing splitter module configured to split the composite optical signal according to polarization; and

said plurality of heterodyne receivers *coupled to the polarizing splitter module.*

However, such polarizing splitter modules are well known in the art for isolating channels according to polarization. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ such a module in the receiver subsystem of Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami. One of ordinary skill in the art would have been motivated to do this since such a module provides another obvious and known way to help demultiplex the transmission channels of Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami.

**Regarding claim 21**, Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami discloses:

The optical communications system of claim 19 wherein the receiver subsystem comprises:

an optical splitter module (Tsushima, divider 16 in Fig. 9) configured to split the composite optical signal; and

a plurality of heterodyne receivers (Tsushima, receivers 3a-3c in Fig. 9) coupled to the optical splitter module configured to recover the subbands, wherein at least one heterodyne receiver comprises:

a polarization controller (Hill, polarization controller 26) configured to match a polarization of an optical local oscillator signal for the heterodyne receiver and a polarization of a tone in a portion of the composite optical signal received by the heterodyne receiver.

**Regarding claims 45-46**, claims 45 and 46 are method claims that introduce limitations that correspond to the limitations introduced by system claims 16 and 17, respectively. Therefore, the recited means in system claims 16-17 read on the corresponding steps in method claims 45-46.

**Regarding claim 47**, claim 47 is a method claim that corresponds largely to the system claim 18. Therefore, the recited means in system claim 18 read on the corresponding steps in method claim 47. Claim 47 also includes limitations absent from claim 18. Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami also discloses these limitations:

optically combining the optical signals so that a lower optical sideband (Tsushima, e.g., the lower half of band ch.n in Fig. 3A) of the first optical signal is adjacent (Dekker, via passband 14 in Fig. 5) to an upper optical sideband of the second optical signal (Tsushima, e.g., the upper half of band ch.(n-1) in Fig. 3A).

**Regarding claim 48**, claim 48 is a method claim that introduces limitations that correspond to the limitations introduced by system claim 20. Therefore, the recited means in system claim 20 read on the corresponding steps in method claim 48.

**Regarding claim 49**, claim 49 is a method claim that corresponds largely to the system claim 21. Therefore, the recited means in system claim 21 read on the corresponding steps in method claim 49. Claim 49 also includes limitations absent from claim 21. Tsushima in view of Bergano, Dekker, Watanabe, Hill, and Ramaswami also discloses these limitations:

mixing (Hill, col. 5, l. 21-29) the pilot tone and the polarization-matched signal.

26. **Claims 22-23, 25-27, 29, 50, and 52** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima in view of Dekker.

**Regarding claim 22**, claim 22 corresponds largely to claim 1, except that claim 22 lacks the following limitation of claim 1:

each optical signal having a different polarization,

In the treatment of claim 1 above, Bergano was applied to address this limitation. Since claim 22 lacks this limitation, Bergano is not applied here to claim 22. However, Tsushima and Dekker were applied to address the other limitations of claim 1 above. Tsushima and Dekker are similarly applied here to address the corresponding limitations of claim 22 here.

**Regarding claims 23 and 25-27**, claims 23, 25, 26, and 27 are system claims that introduce limitations that correspond to the limitations introduced by system claims 4, 8, 10, and 11, respectively. Tsushima and Dekker were applied to address these limitations in the treatment of claims 4, 8, and 10-11 above. Tsushima and Dekker are similarly applied here to address the corresponding limitations of claims 23 and 25-27 here.

**Regarding claim 29**, Tsushima in view of Dekker discloses:

The optical communications system of claim 22 further comprising:

a receiver subsystem coupled to the transmitter subsystem by an optical fiber, the receiver subsystem comprising:

an optical splitter (divider 16 in Fig. 9) for splitting the composite optical signals into multiple signals; and

a plurality of heterodyne receivers (receivers 3a-3c) coupled to the optical splitter for recovering information from the signals.

**Regarding claim 50**, claim 50 is a method claim that corresponds largely to the system claim 22. Therefore, the recited means in system claim 22 read on the corresponding steps in method claim 50. Claim 50 also includes limitations absent from claim 22. Tsushima in view of Dekker also discloses these limitations:

transmitting the composite optical signal across an optical fiber (optical fiber 2).

**Regarding claim 52**, claim 52 is method claim that introduces limitations that correspond to the limitations introduced by system claim 27. Therefore, the recited means in system claim 27 read on the corresponding steps in method claim 52.

27. **Claim 24** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima in view of Dekker as applied to claim 22 above, and further in view of Othonos.

**Regarding claim 24**, claim 24 introduces limitations that correspond to the limitations introduced by claim 7. Othonos were applied to address these limitations of claim 7. Similarly, Othonos is applied here to address the corresponding limitations in claim 24.

28. **Claims 28 and 53** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima in view of Dekker as applied to claim 22 above, and further in view of Watanabe and Hill.

**Regarding claim 28**, claim 28 introduces limitations that correspond to the limitations introduced by claim 14. Watanabe and Hill were applied to address these limitations of claim 14. Similarly, Watanabe and Hill are applied here to address the corresponding limitations in claim 28.

**Regarding claim 53**, claim 53 is a method claim that introduces limitations that correspond to the limitations introduced by system claim 28. Therefore, the recited means in system claim 28 read on the corresponding steps in method claim 53.

29. **Claims 51 and 54** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima in view of Dekker as applied to claim 50 above, and further in view of Bergano.

**Regarding claim 51**, claim 51 introduces limitations that correspond to the limitations introduced by claims 1-2. Bergano was applied to address these limitations of claims 1-2. Similarly, Bergano is applied here to address the corresponding limitations in claim 51.

**Regarding claim 54**, claim 54 introduces limitations that correspond to the limitations introduced by claim 20. An obviousness argument was applied to address these limitations of claim 20. Similarly, the same obviousness argument is applied here to address the corresponding limitations in claim 54.

## *Conclusion*

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lyu et al., Peral et al., Bai, and Webb are cited to show wavelength-locking teachings that have some similarities with Applicant's wavelength-locking teachings. In particular, notice that Peral et al., Webb,

and Applicant's invention all employ two optical taps and a ratio of tapped portions of optical signals to control the wavelength of these optical signals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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DSK

A. Bello

AGUSTIN BELLO
PRIMARY EXAMINER

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30 NOVEMBER 2005

Replacement Sheet

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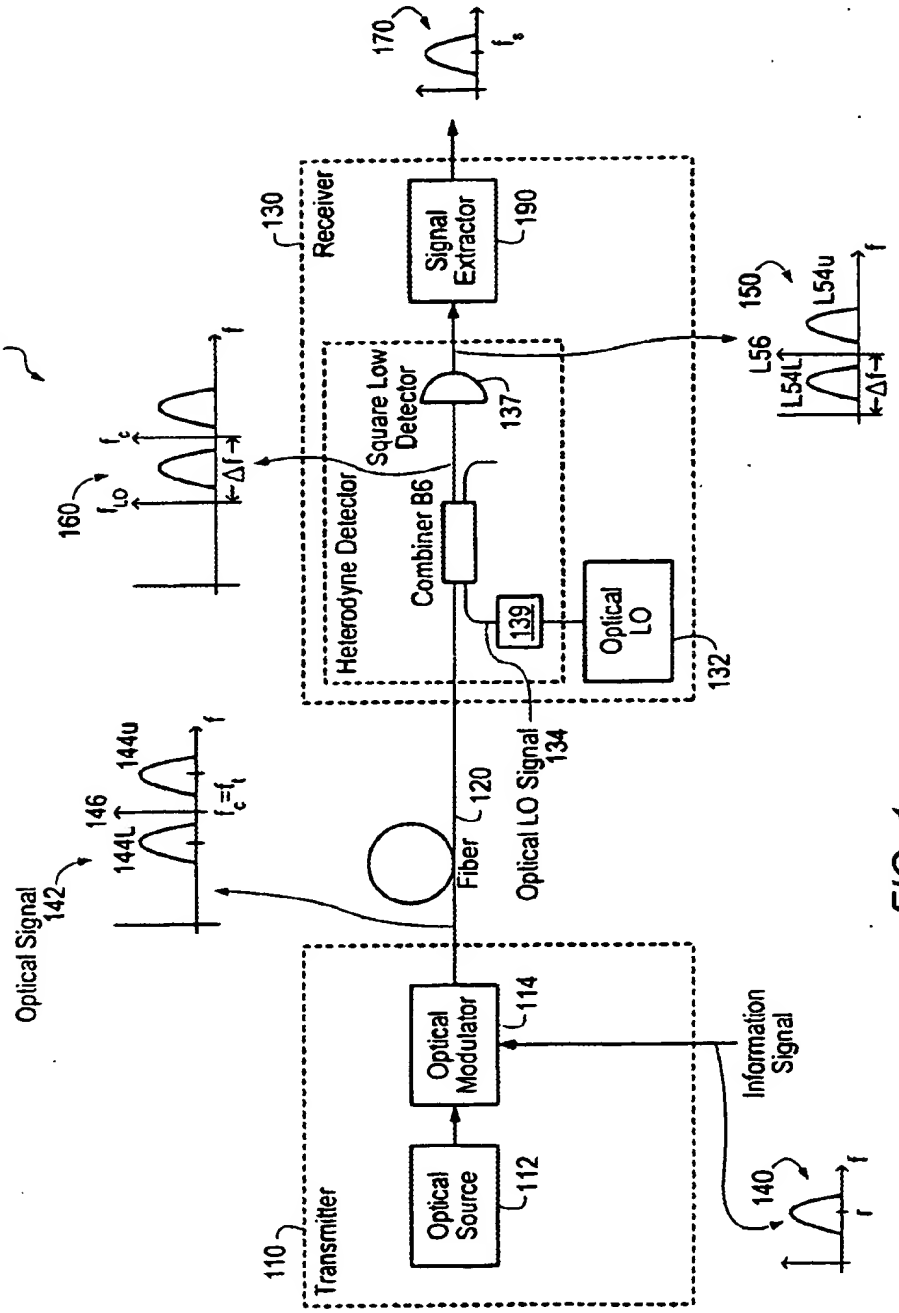


FIG. 1

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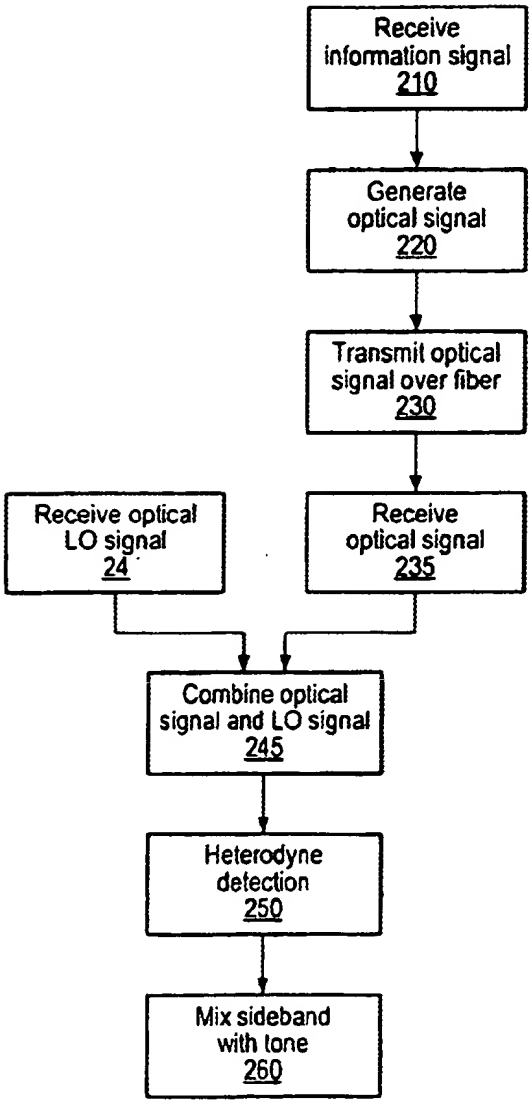


FIG. 2

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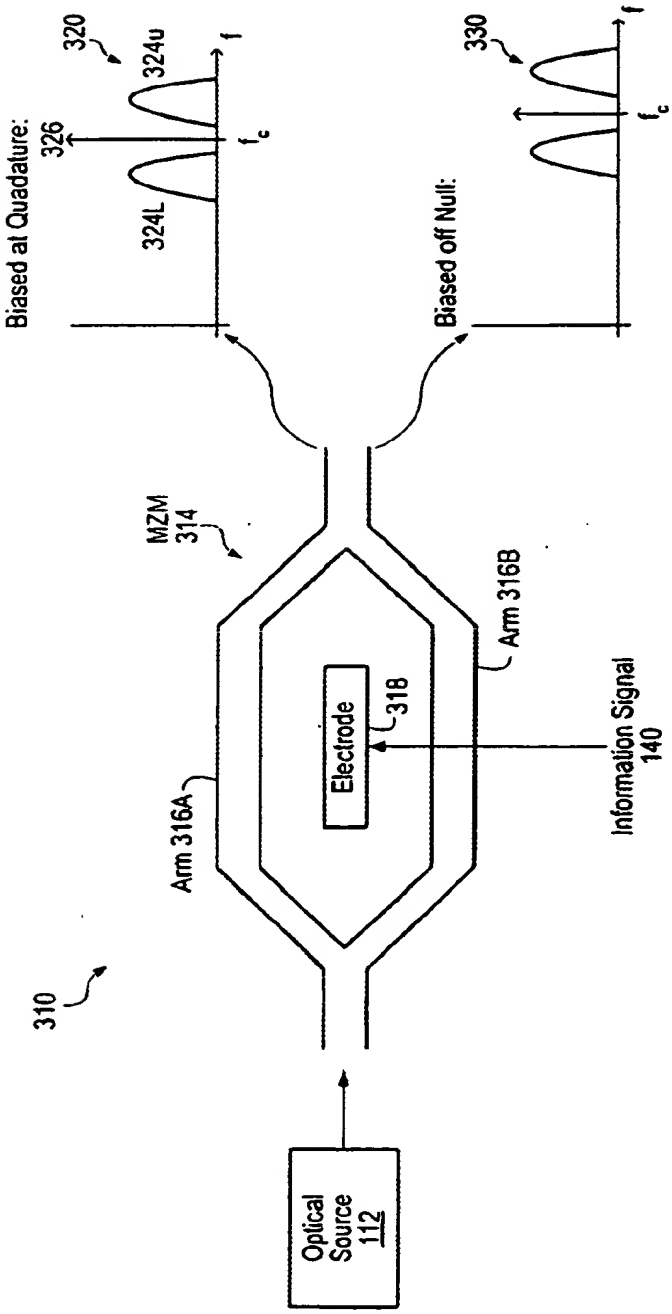


FIG. 3

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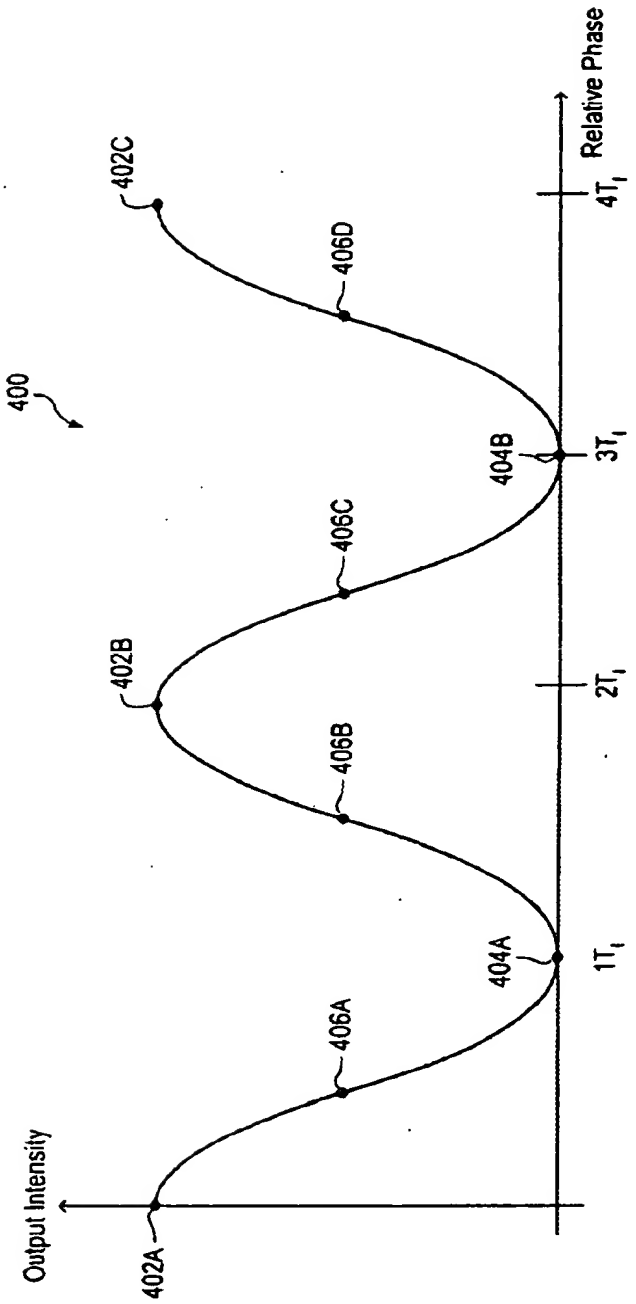


FIG. 4

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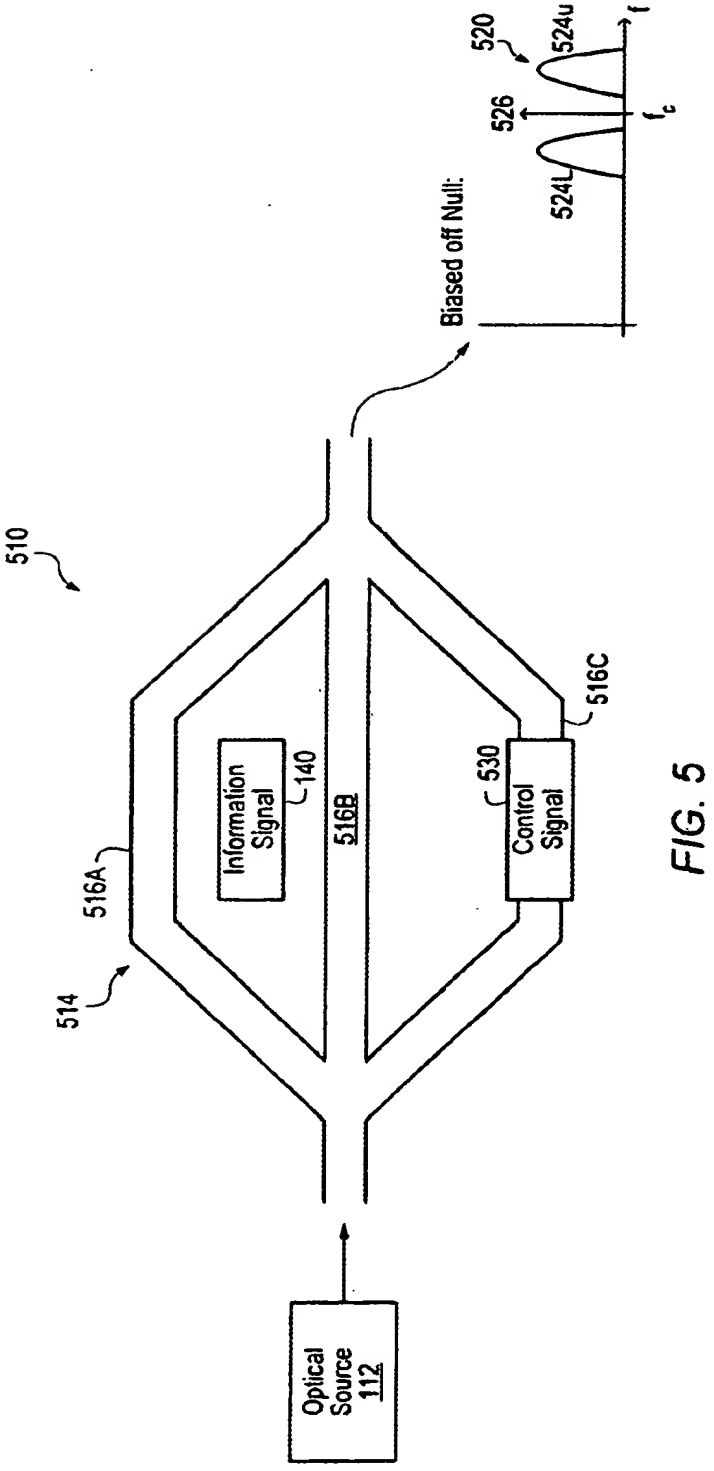


FIG. 5

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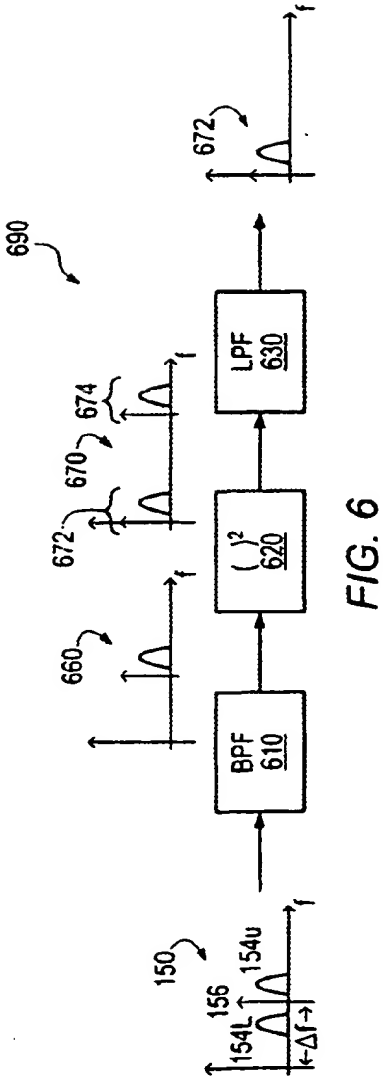


FIG. 6

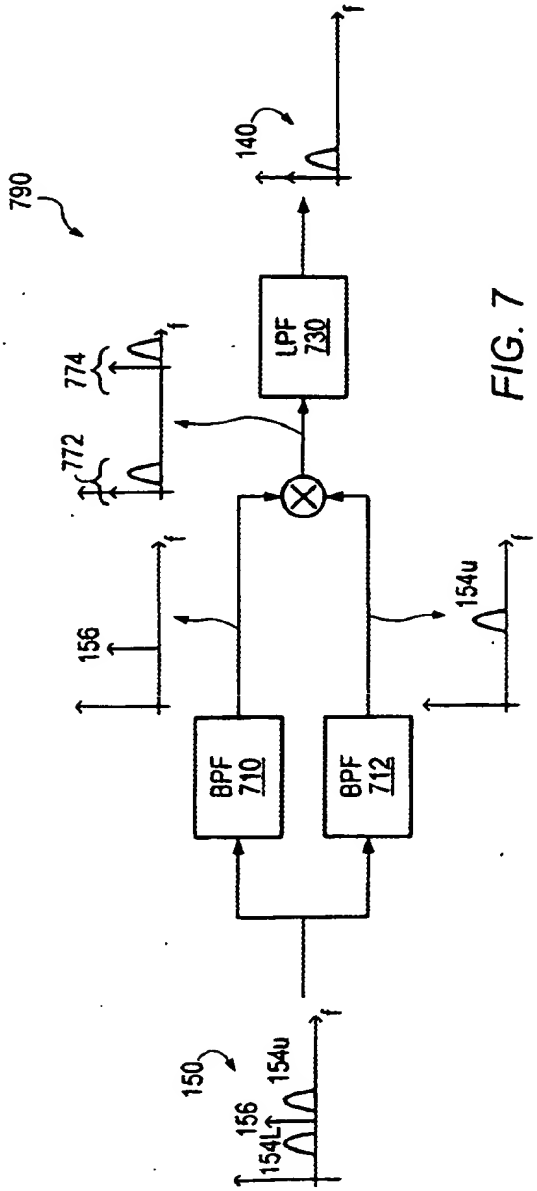


FIG. 7

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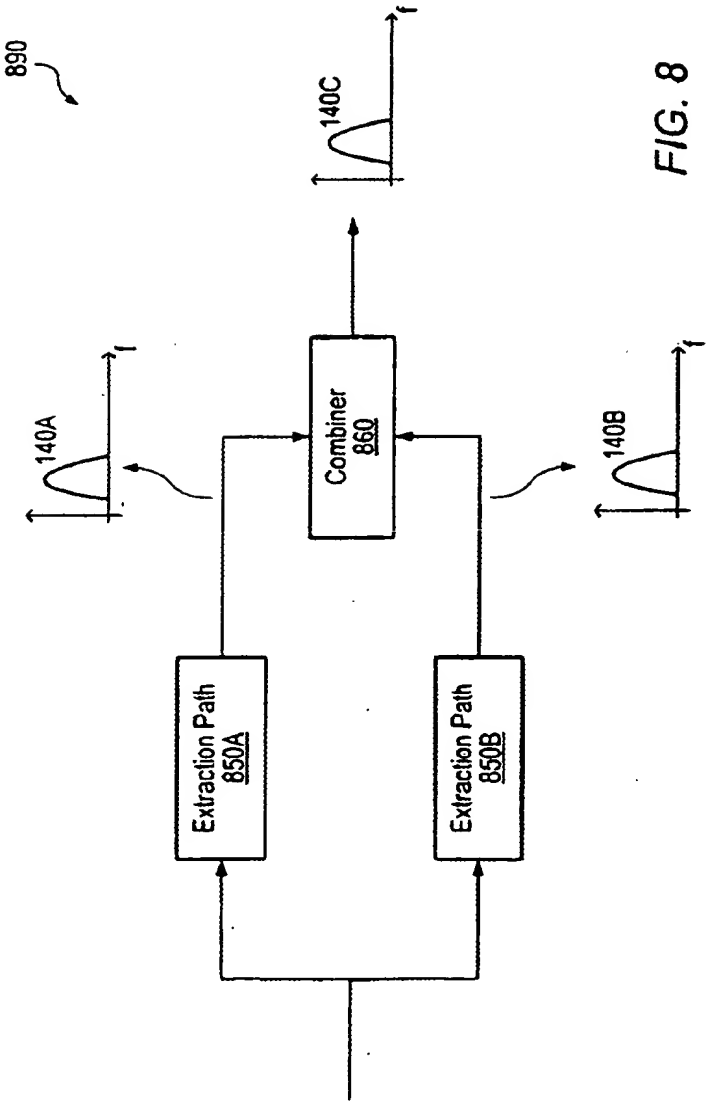


FIG. 8

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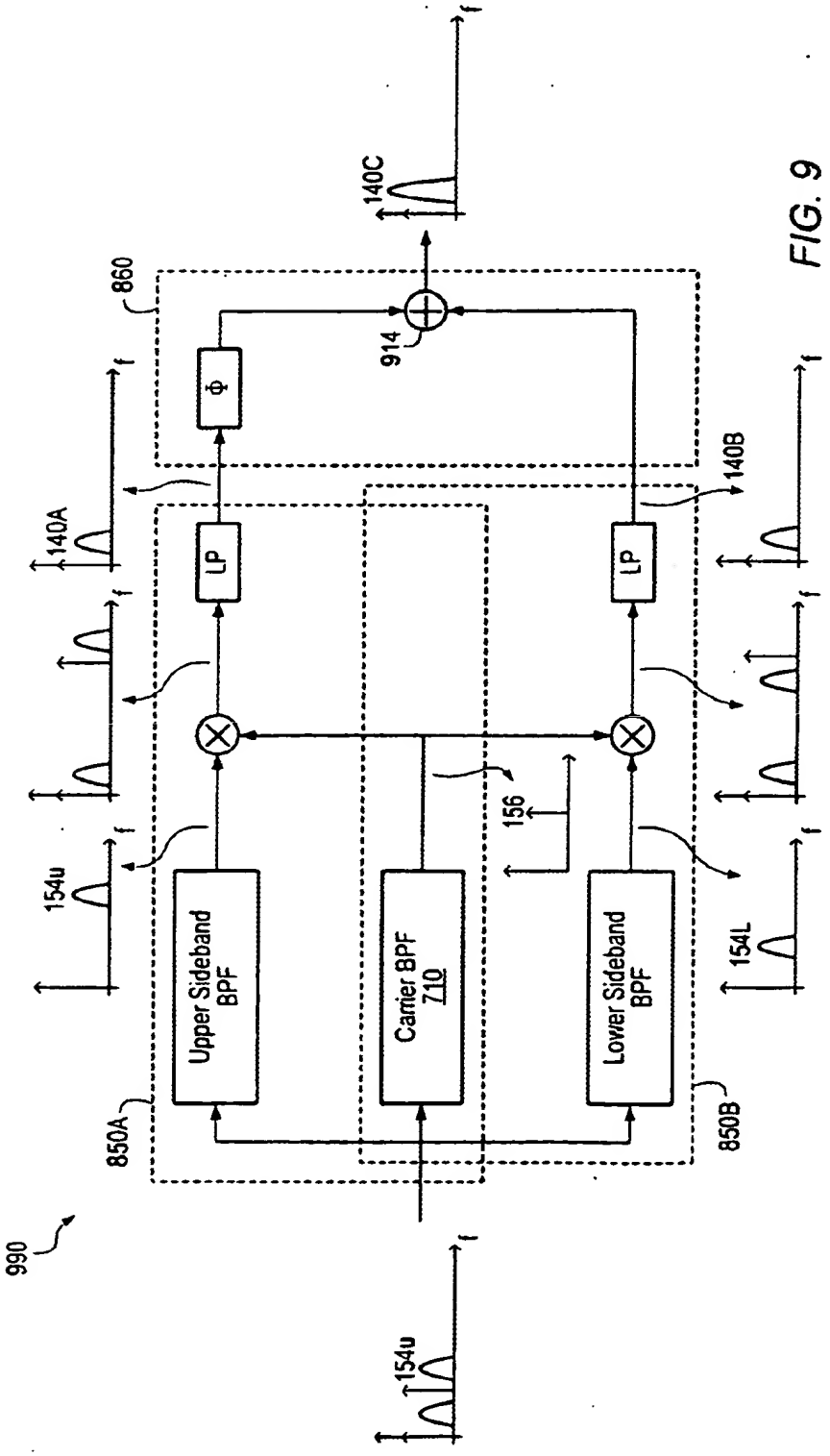


FIG. 9

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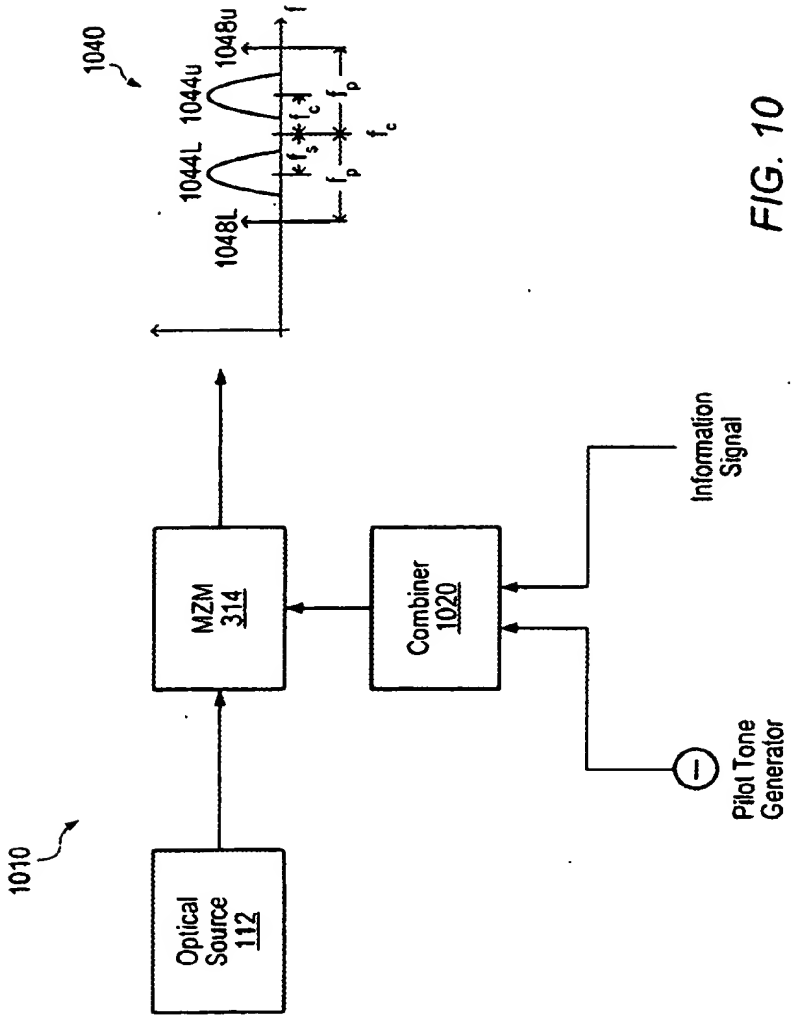


FIG. 10

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30 NOVEMBER 2005

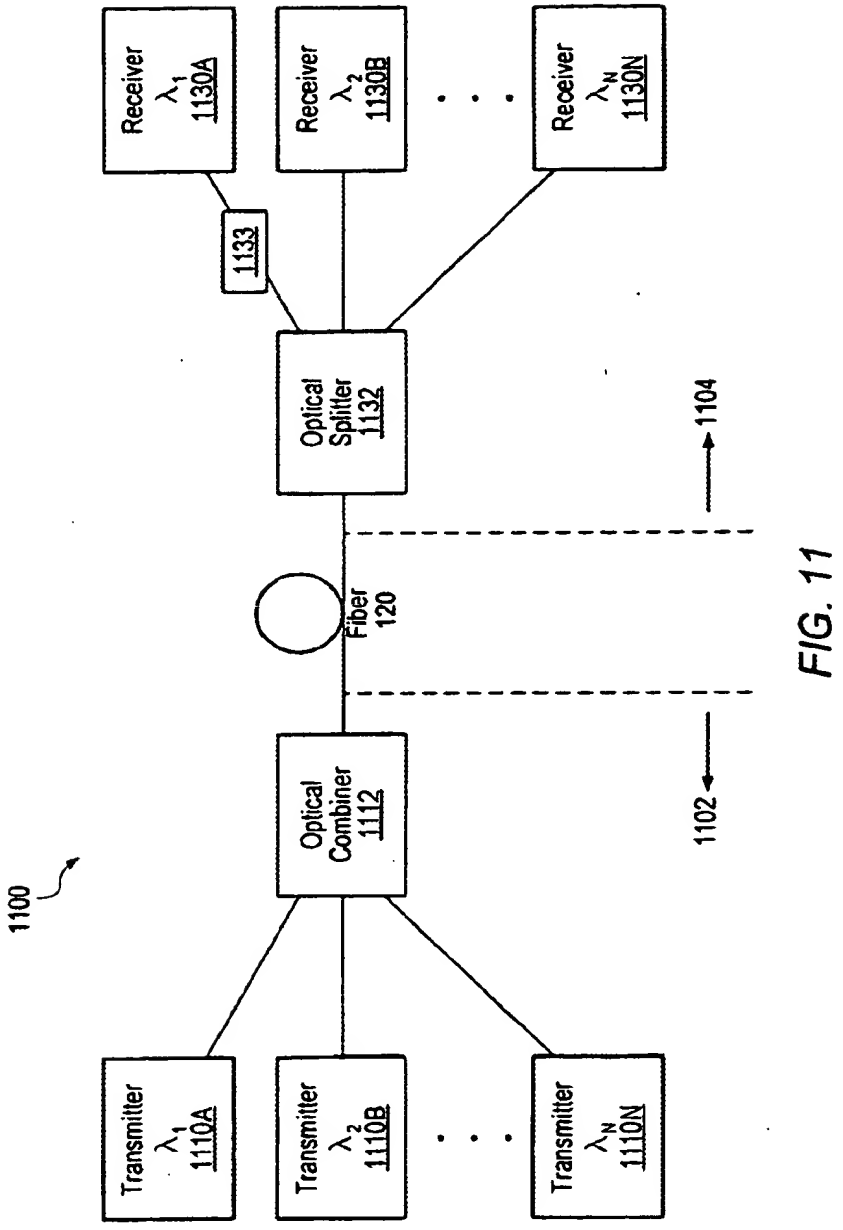


FIG. 11

Disapproved by PSK
30 NOVEMBER 2005



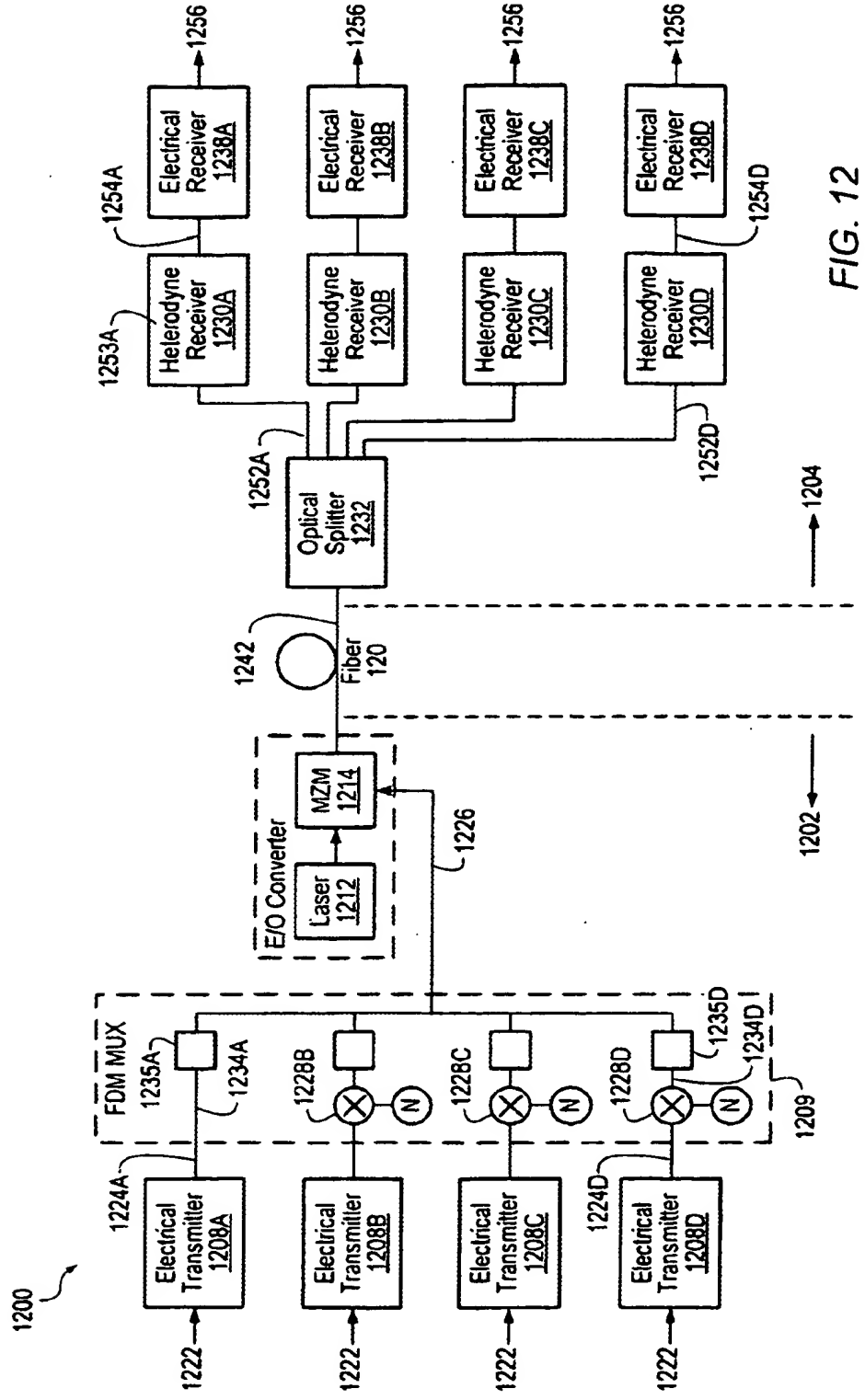


FIG. 12

Disapproved by PSK
30 NOVEMBER 2005



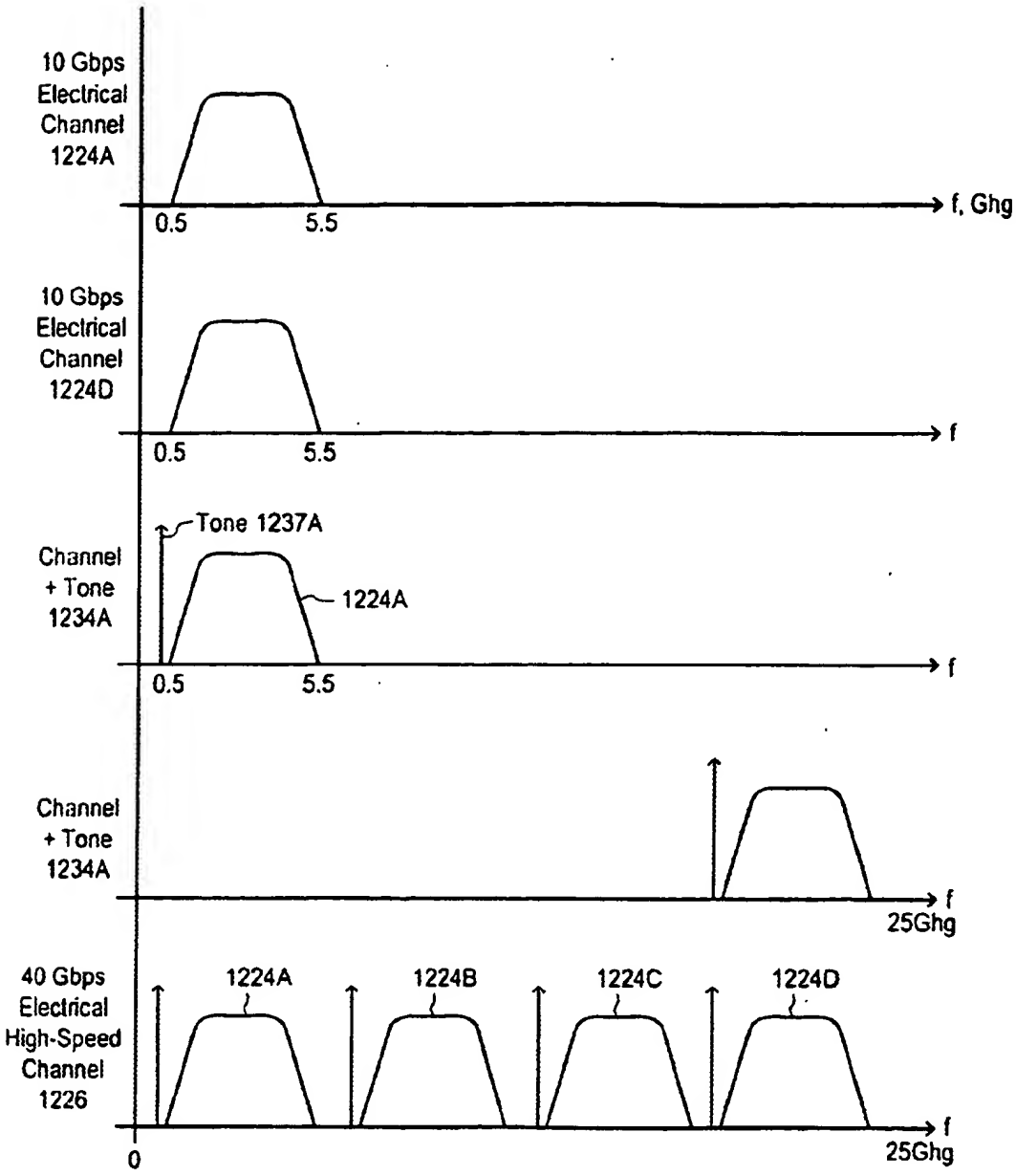


FIG. 13A

Approved by DSK
30 NOVEMBER 2005

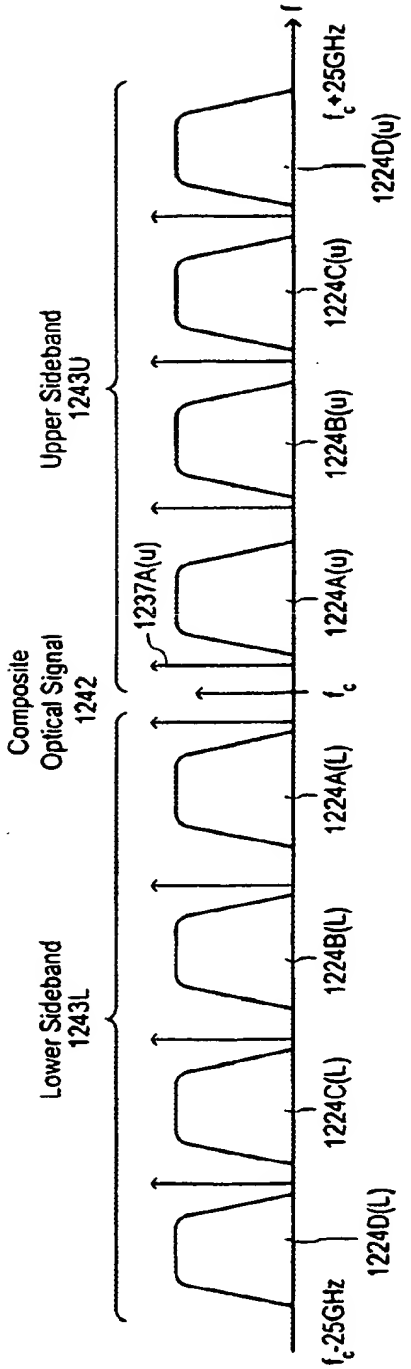


FIG. 13B

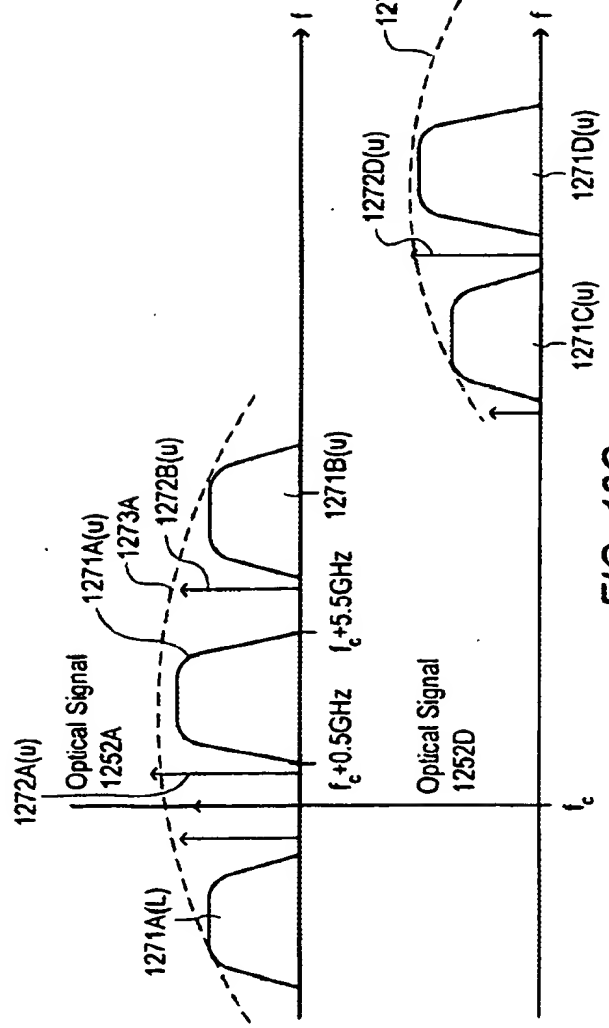


FIG. 13C

Disapproved by DSK
30 NOVEMBER 2005



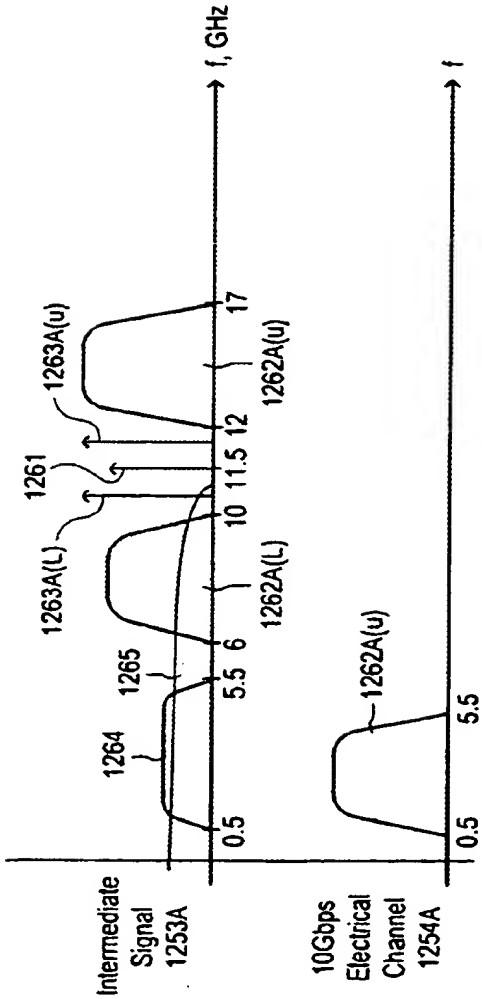


FIG. 13D

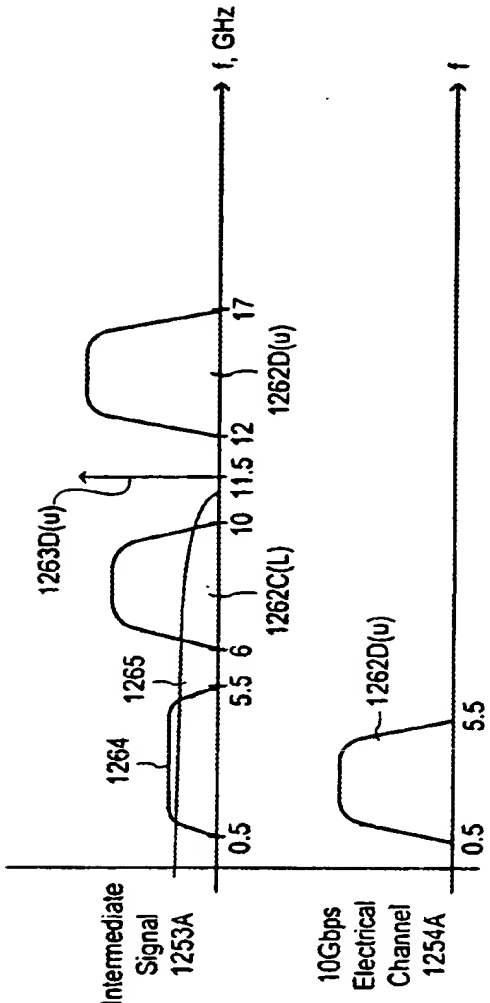


FIG. 13E

Disapproved by DSR
30 NOVEMBER 2005

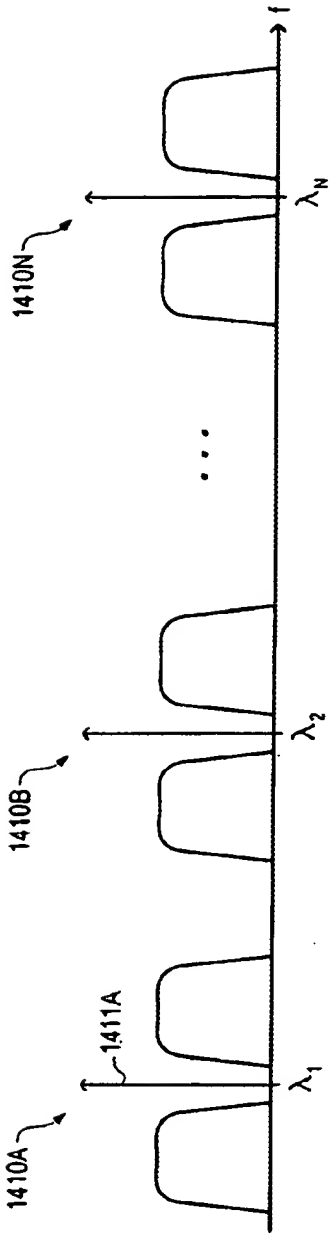


FIG. 14A

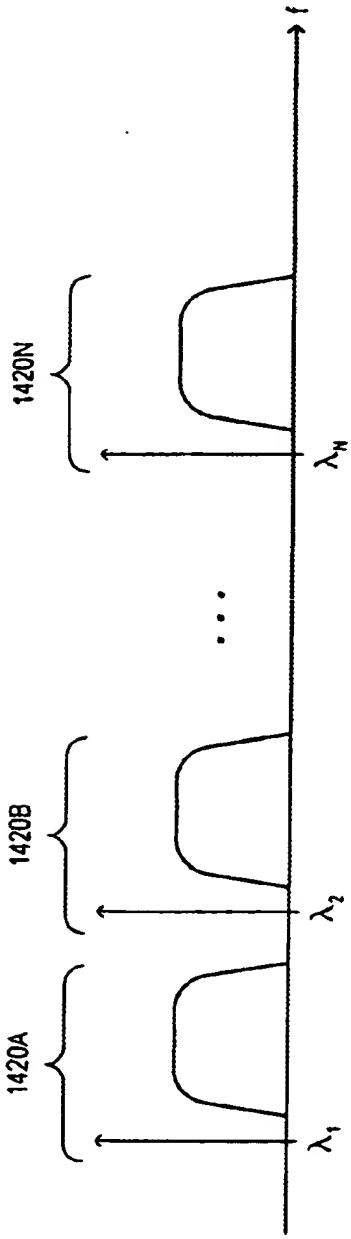


FIG. 14B

Approved by PSK
30 NOVEMBER 2005



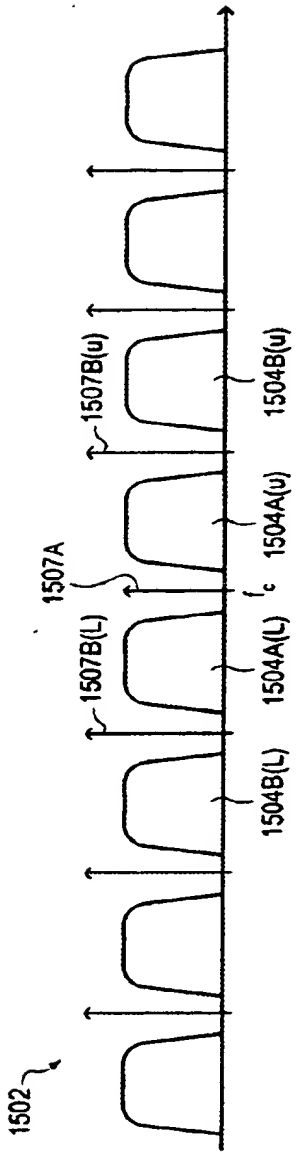


FIG. 15A

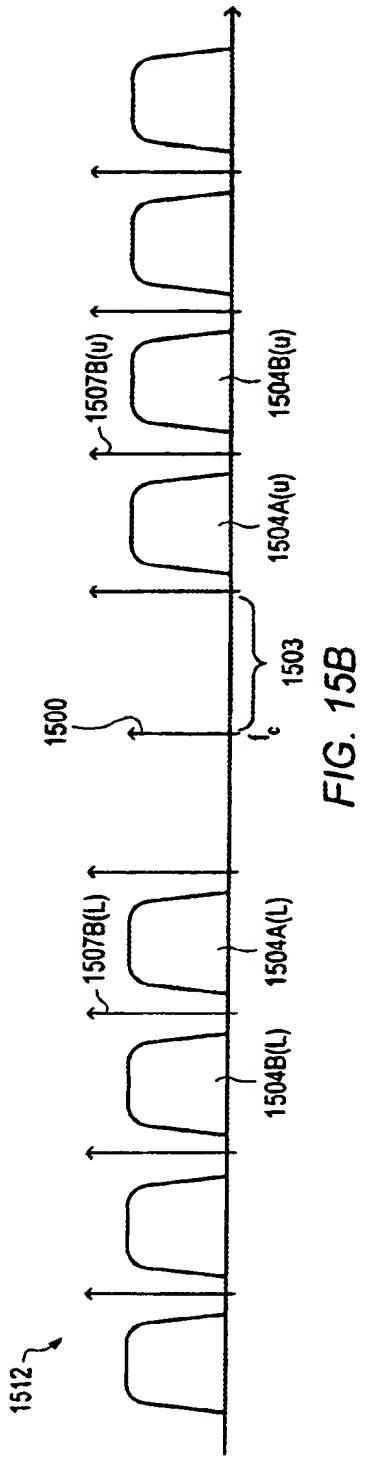


FIG. 15B

Approved by DSK
30 NOVEMBER 2005

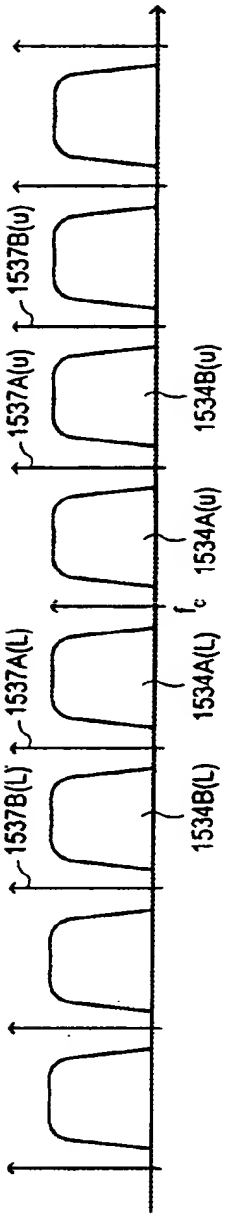


FIG. 15C

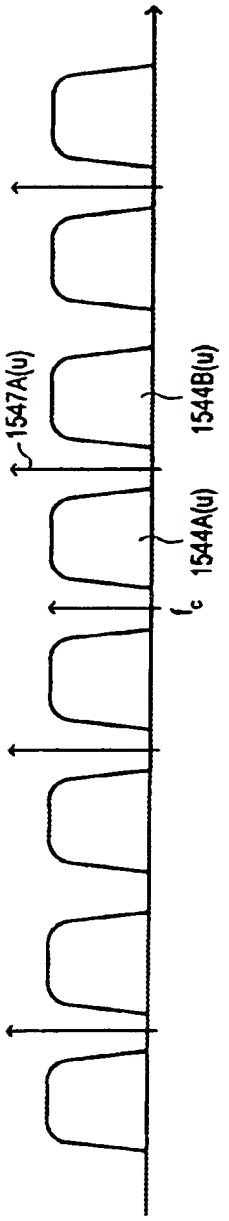


FIG. 15D

Disapproved by DSK
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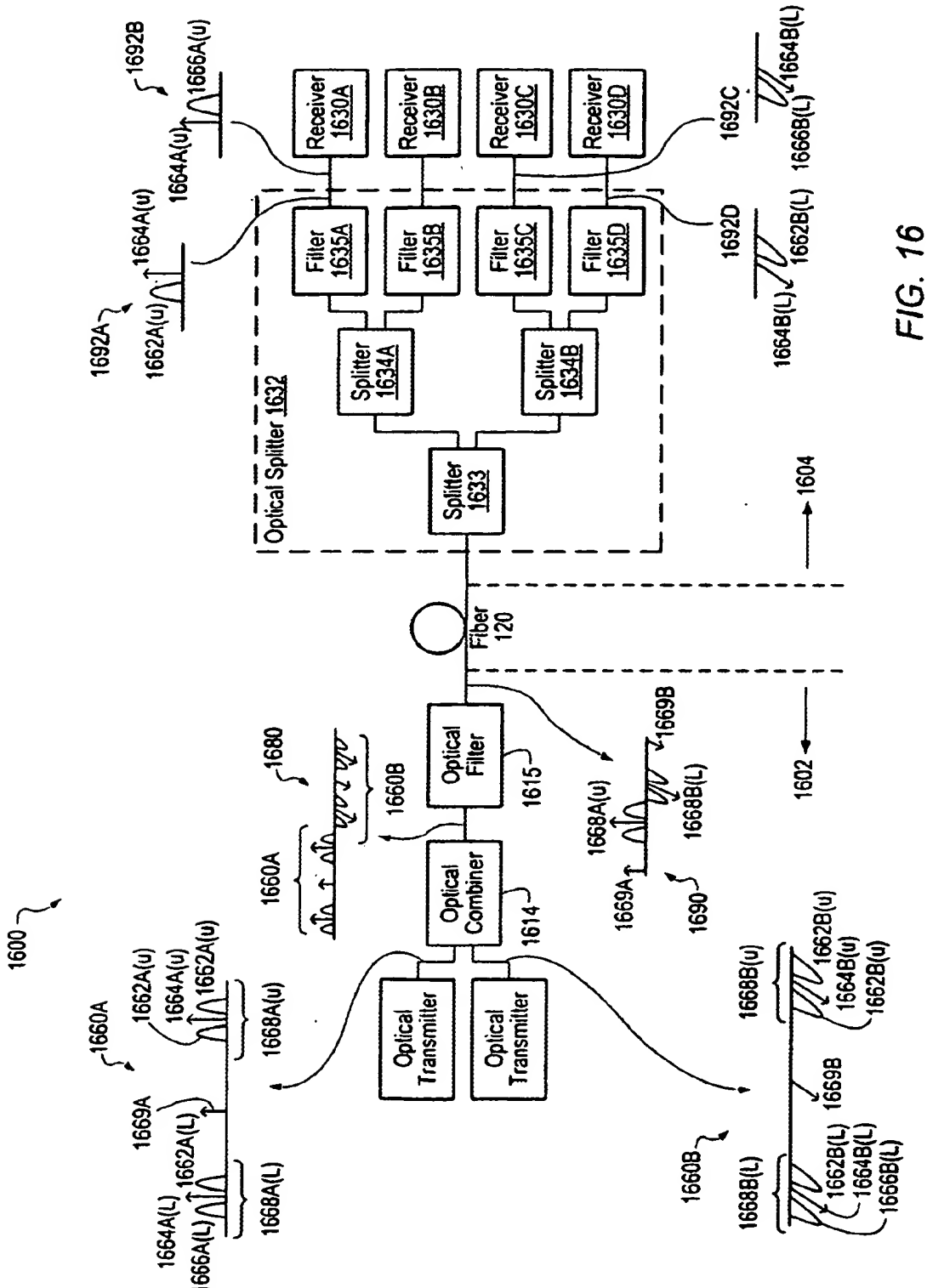


FIG. 16

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30 NOVEMBER 2005

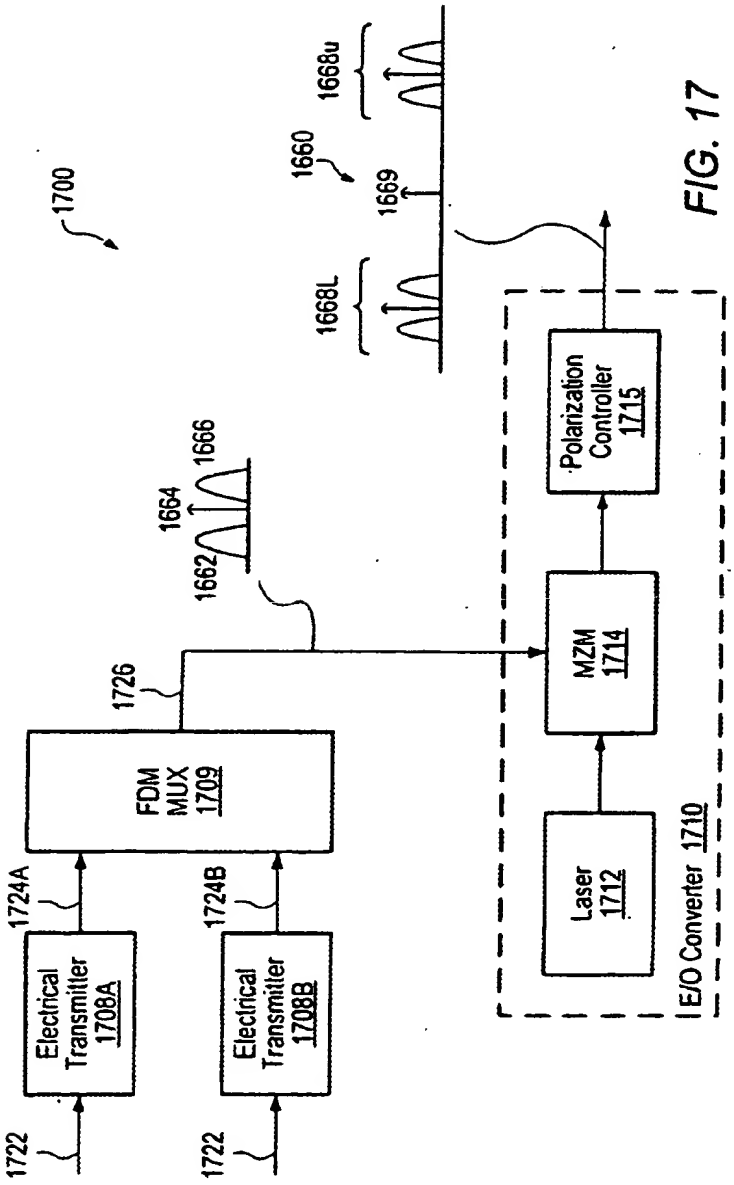


FIG. 17

Disapproved by DSK
30 NOVEMBER 2005

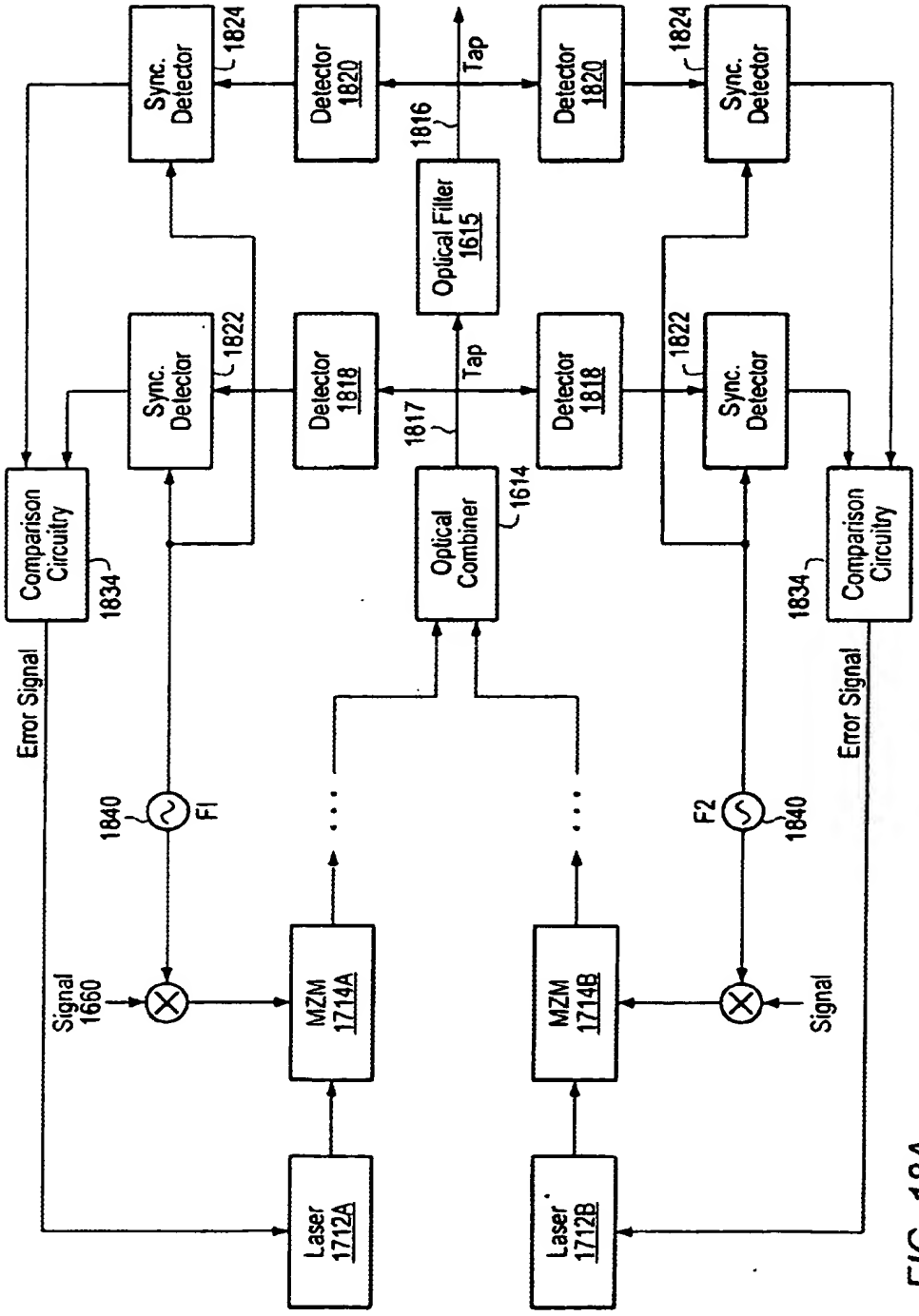


FIG. 18A

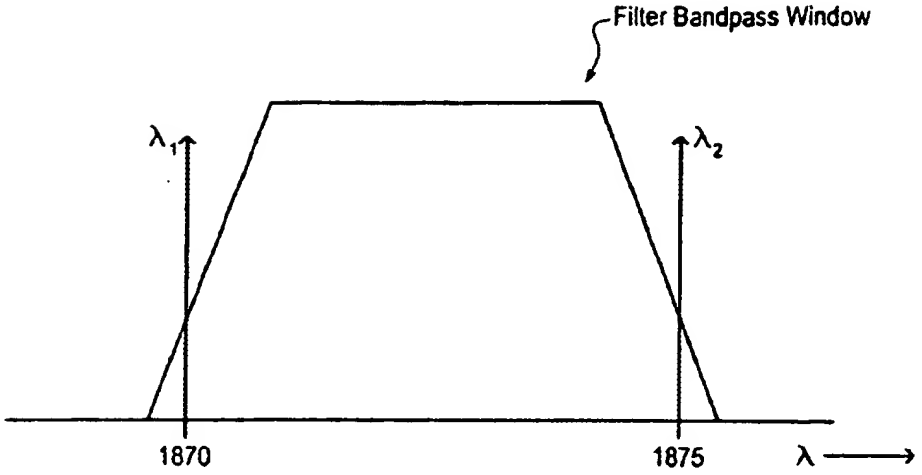


FIG. 18B

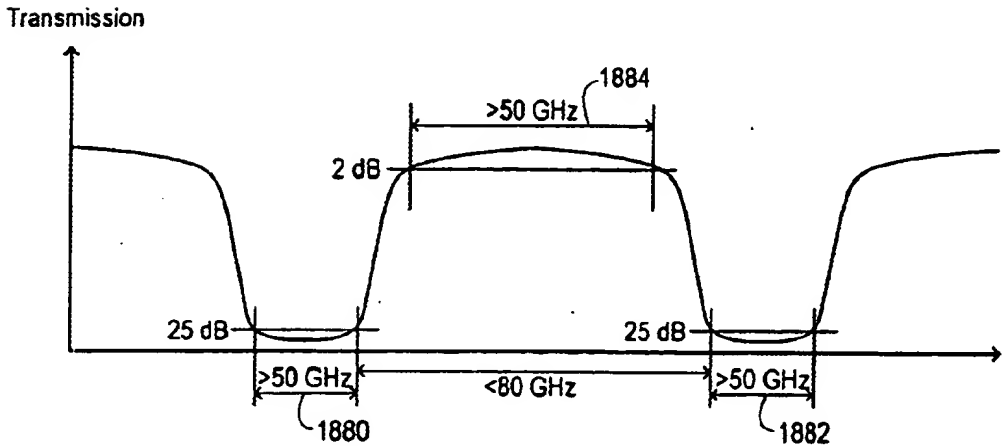


FIG. 18C

Approved by DSK
30 NOVEMBER 2005

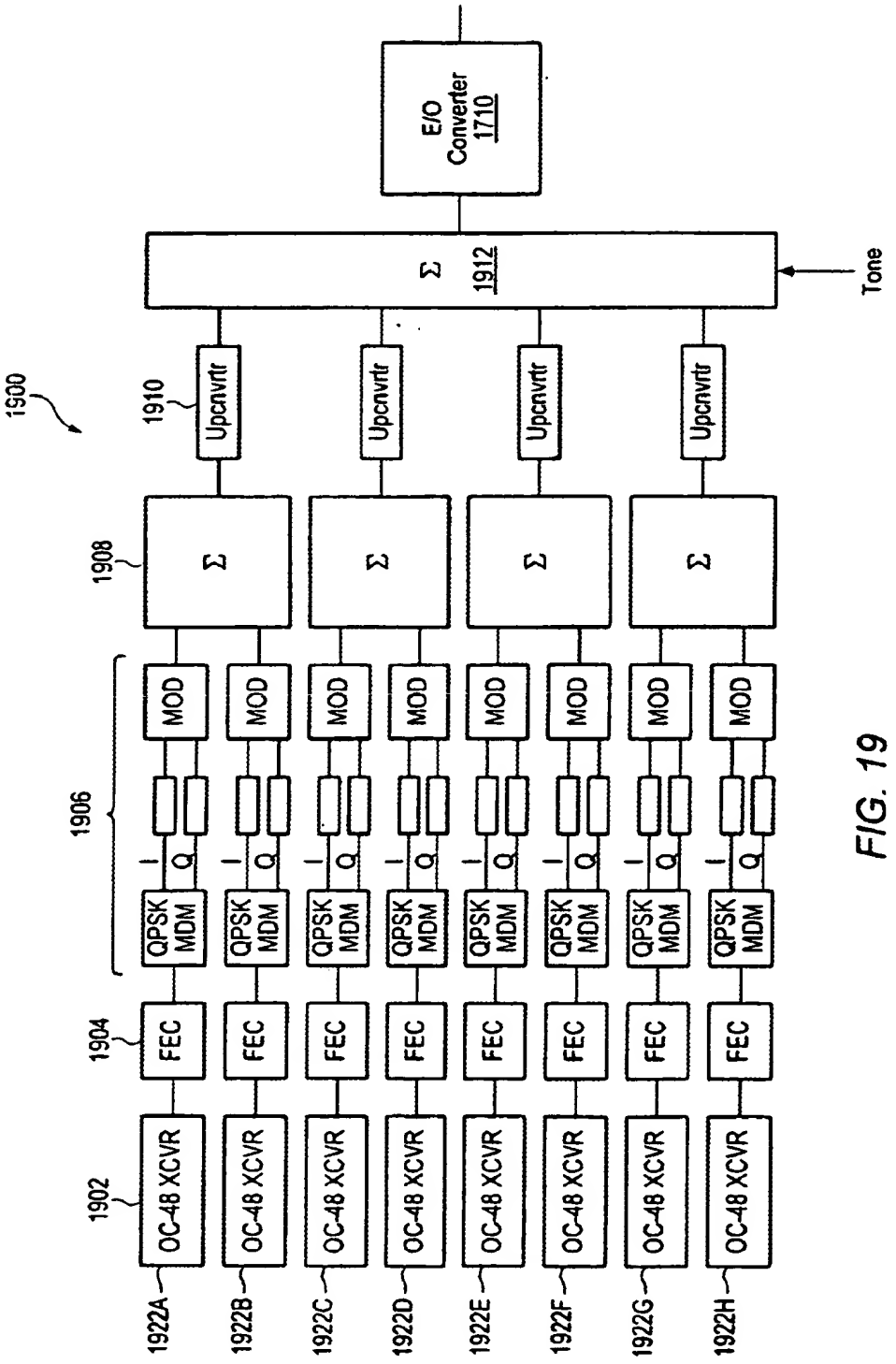


FIG. 19

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30 NOVEMBER 2005

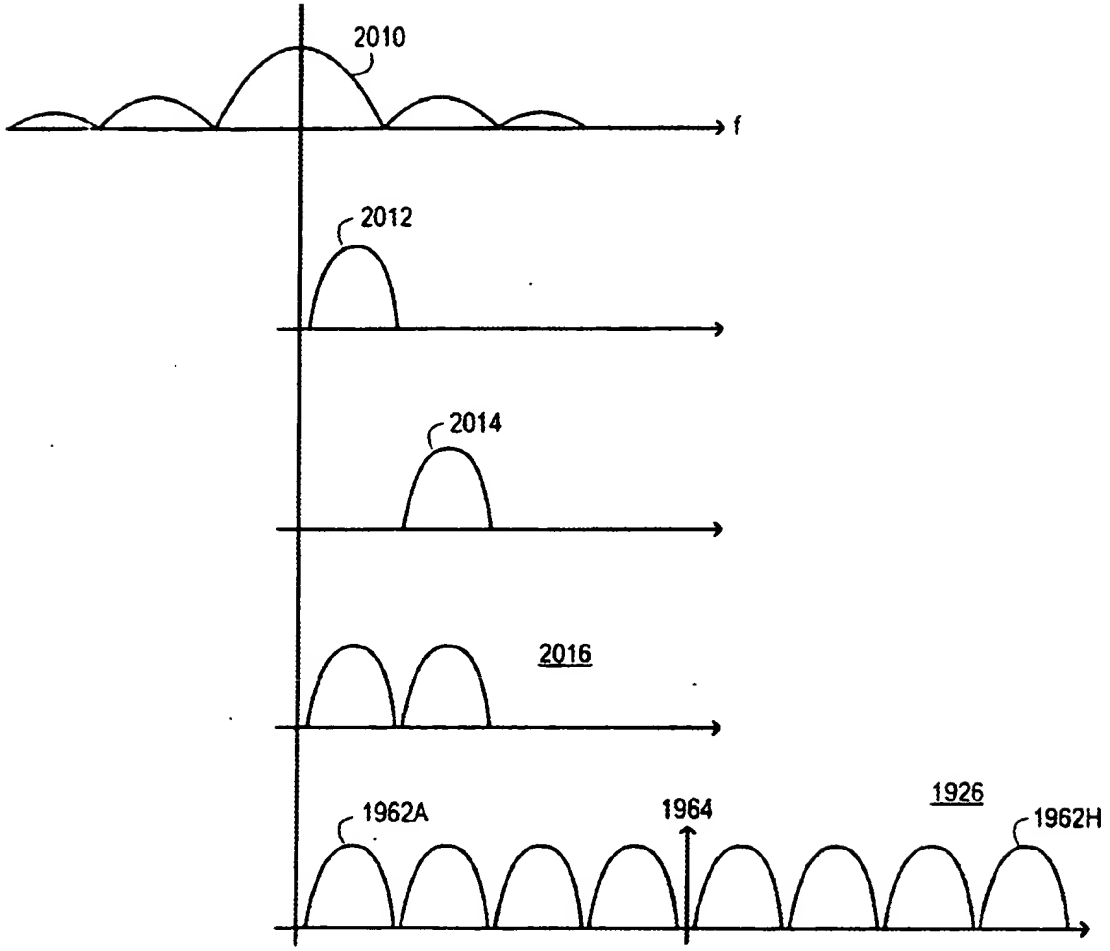


FIG. 20A

Approved by DSK
30 NOVEMBER 2005

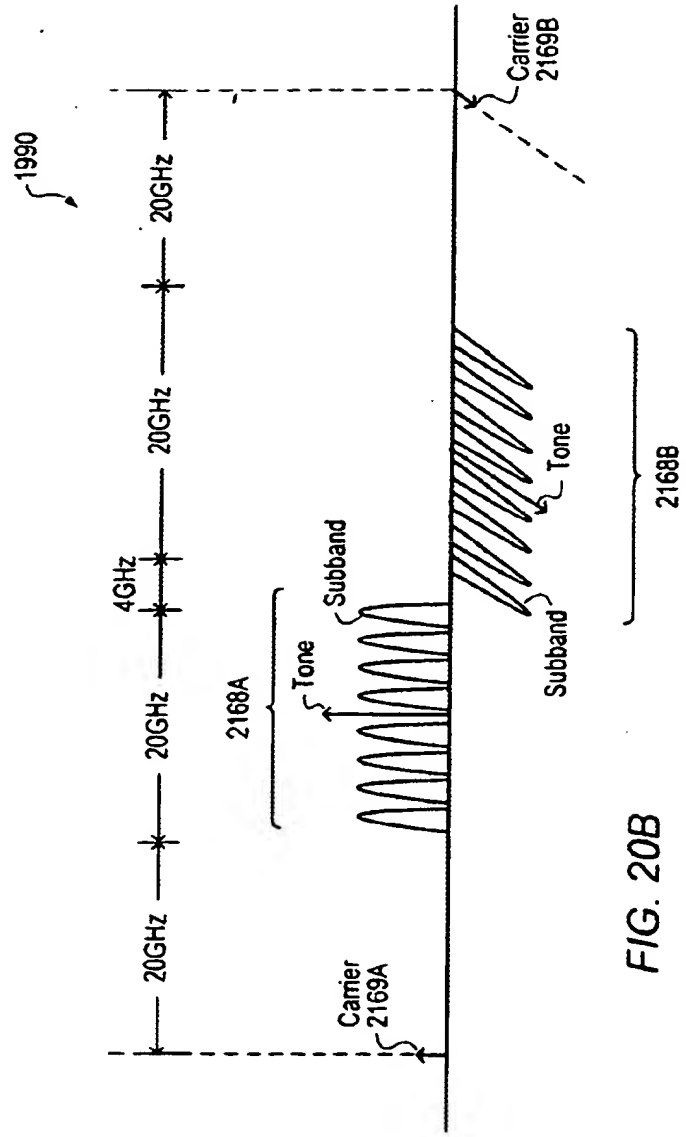


FIG. 20B

Approved by DSK
30 NOVEMBER 2005

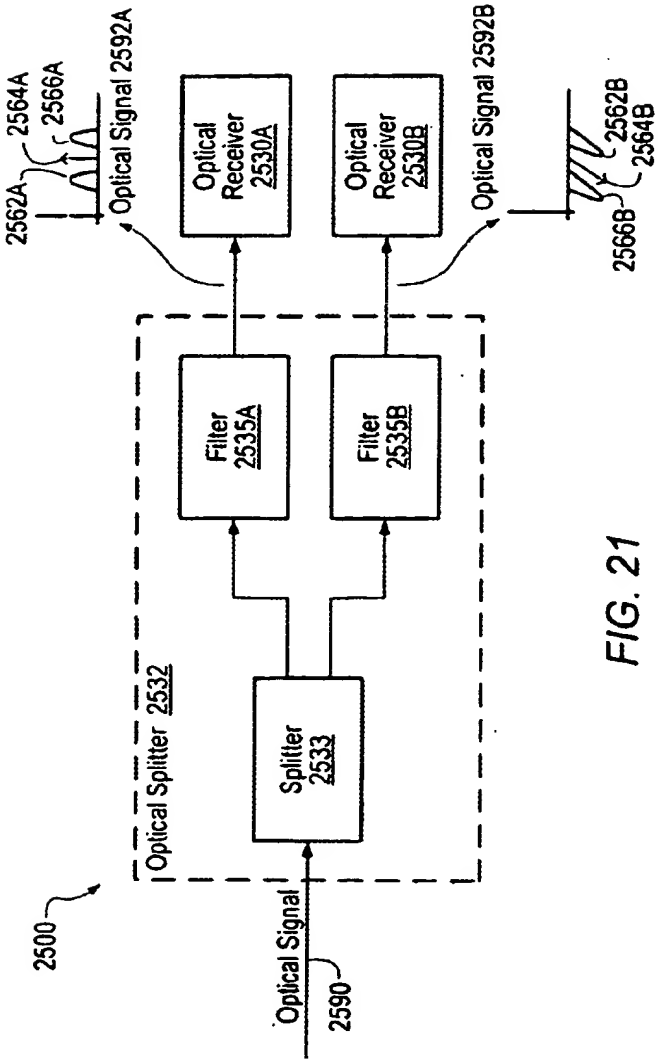


FIG. 21

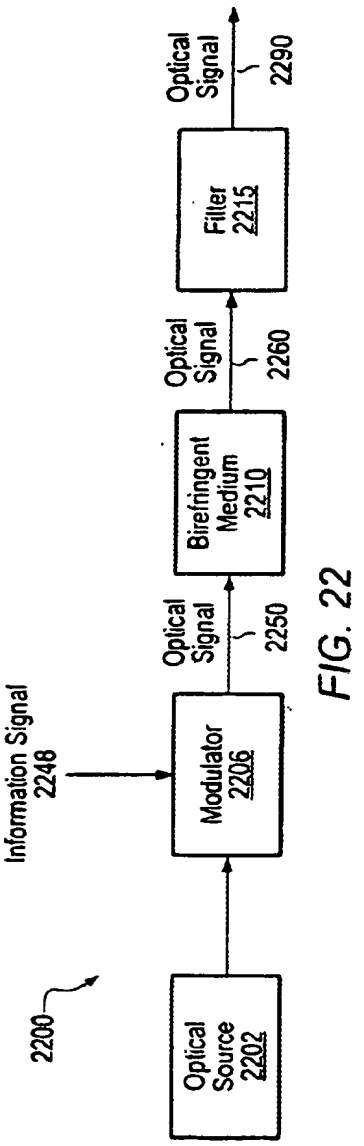


FIG. 22

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30 NOVEMBER 2005



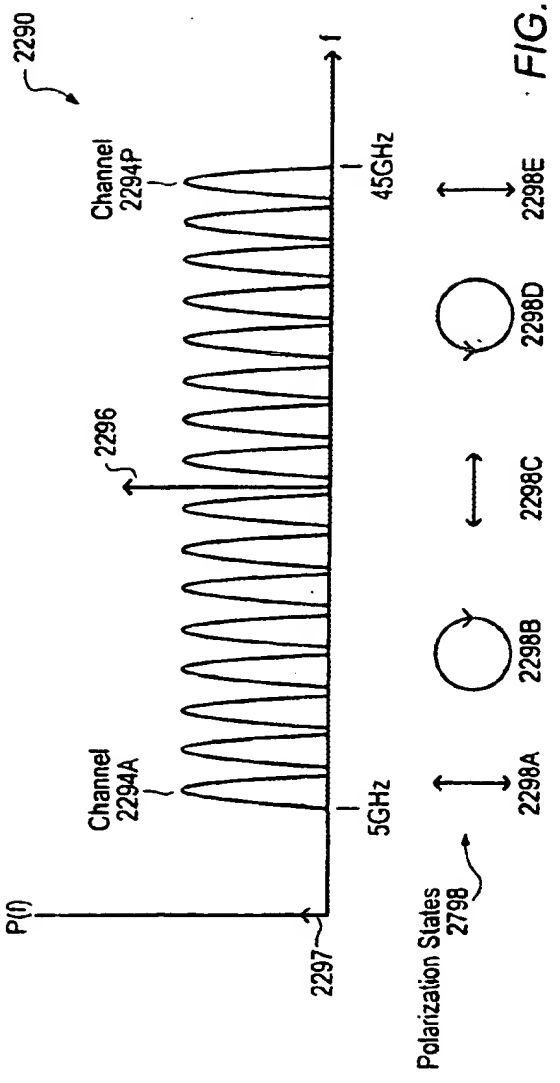


FIG. 23

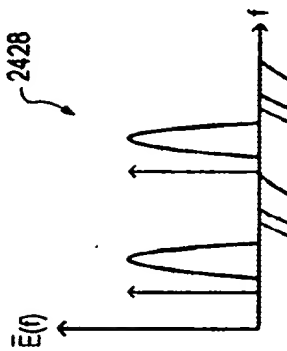


FIG. 24D

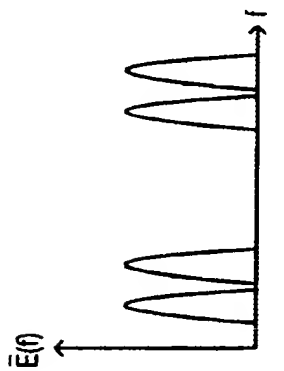


FIG. 24C

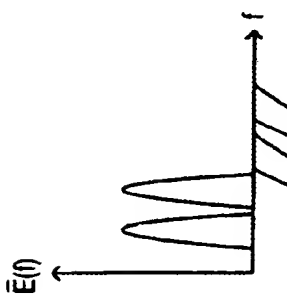


FIG. 24B

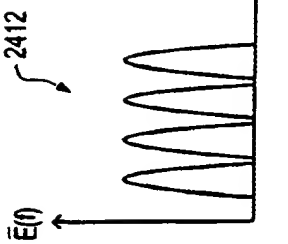


FIG. 24A

Approved by DSK
30 NOVEMBER 2005

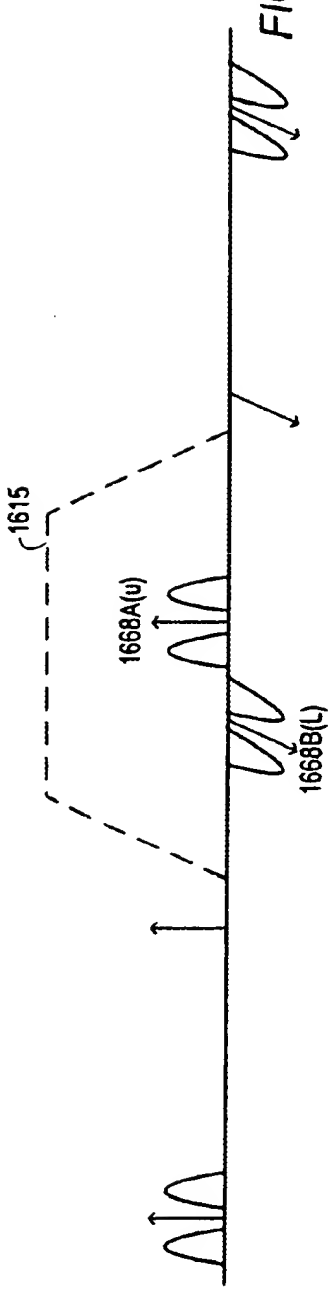


FIG. 25A

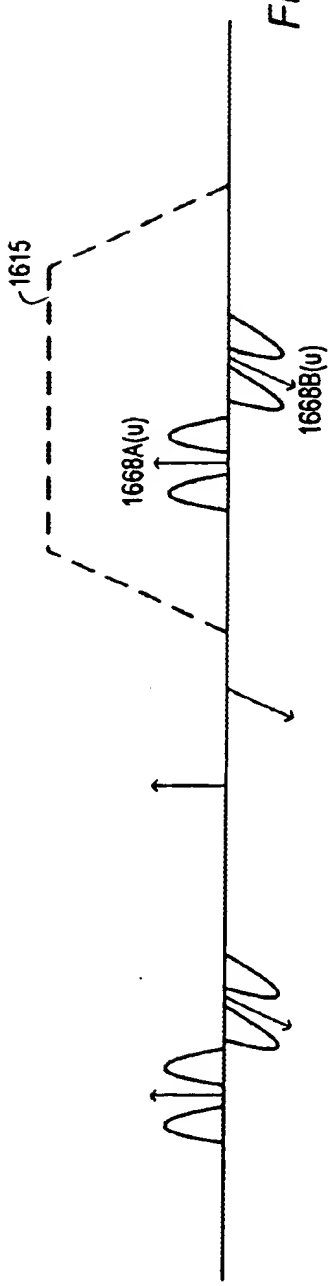


FIG. 25B

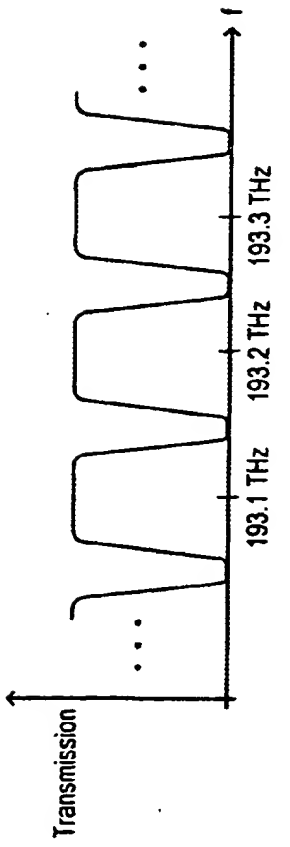


FIG. 26

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Replacement Sheet

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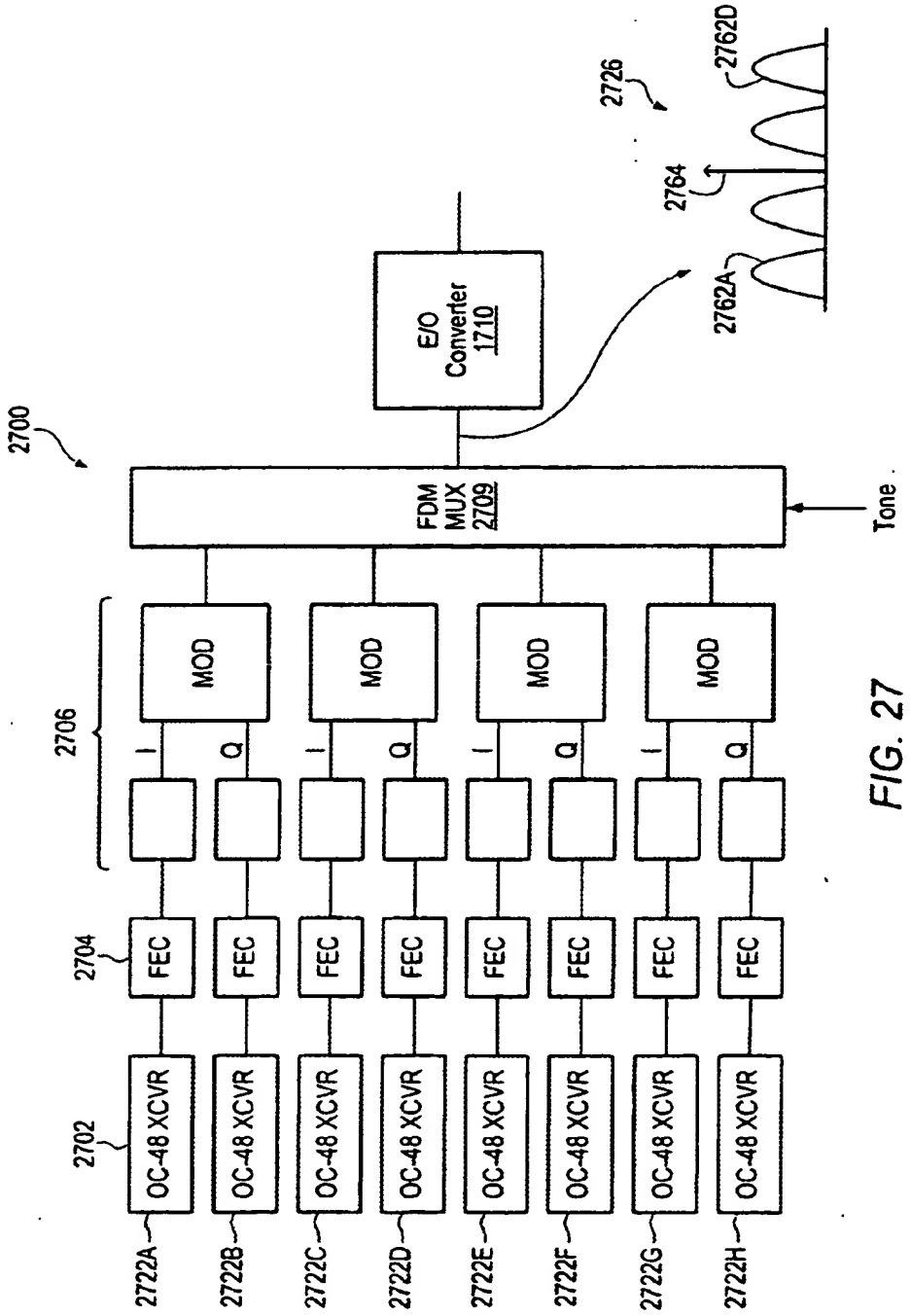


FIG. 27